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MOBILE MONITORING SURVEY

OF THE BOW CORRIDOR

March 2 and 12, 1994

Alberta
ENVIRONMENTAL PROTECTION

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MOBILE MONITORING SURVEY

OF THE BOW CORRIDOR

March 2 and 12, 1994

Prepared by:

Air Issues and Monitoring Branch
Alberta Environmental Protection

February 1995

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SUMMARY

Alberta Environmental Protection conducted an air quality monitoring study in the Bow Corridor in response to a request from the Environmental Advisory Committee of the Canmore Town Council. The air quality study consisted of two components: (1) a mobile survey of Canmore, Exshaw, Banff and local highways in the region; and (2) an inhalable particulate study of the Canmore area. The results of the mobile monitoring study are included in this report. The results of the inhalable particulate study are presented in the report entitled *"Air Quality Survey of Inhalable Particulates in the Town of Canmore - March 1 to May 10, 1994"*.

The air quality issues to be addressed by the air quality study include: (1) smoke from local and regional sources; (2) vehicle exhaust emissions from the Trans-Canada Highway and in local communities; and (3) dust and haze from industrial activities in Exshaw. The mobile monitoring component provided a preliminary assessment of vehicle emissions in the region and emissions from industrial sources in the Exshaw area. The particulate study will provide more detailed information on the components of smoke from local and regional sources, vehicle exhaust and the influence of industrial emissions on the Canmore area.

Carbon monoxide, oxides of nitrogen and some types of hydrocarbons are components of vehicle exhaust. Concentrations of these parameters were generally highest in the communities of Canmore, Exshaw and Banff. Relatively high concentrations of oxides of nitrogen were also recorded on the Trans-Canada Highway. The highest concentration of carbon monoxide (average of 2.2 ppm) was recorded in Banff. Mobile monitoring in the Exshaw area resulted in the highest concentrations of nitrogen dioxide (average of 0.030 ppm) and total hydrocarbons (average of 2.0 ppm). One-hour average carbon monoxide and nitrogen dioxide concentrations were substantially lower than the Alberta Environmental Protection guidelines for these pollutants. Since the mobile monitoring unit does not have the ability to differentiate between different hydrocarbon types, it is difficult to determine exactly the sources of man-made hydrocarbons. However, a major source of man-made hydrocarbons in the Banff and Canmore areas is vehicle exhaust emissions. Some hydrocarbons in the Exshaw area may be the result of industrial activities. Normal "background" total hydrocarbon concentrations range from 1.5 to 2.0 ppm.

Sulphur compounds such as hydrogen sulphide and sulphur dioxide recorded low average concentrations during the mobile monitoring study. However, occasions of elevated hydrogen sulphide and sulphur dioxide concentrations were observed on March 12 in the Exshaw area. Maximum one-minute average concentrations of 0.027 and 0.073 ppm were recorded in the Exshaw area for hydrogen sulphide and sulphur dioxide, respectively. Plume impingement from the local cement manufacturing facility was observed during these occasions. Therefore, elevated concentrations of sulphur compounds were due to local industrial activities. One-hour average concentrations of these pollutants were much lower than Alberta Environmental Protection guidelines.

Ozone concentrations showed a pattern similar to what would be expected in the rural environment. Frequent dips in ozone concentrations were evident in areas of relatively high traffic density. This was likely due to emissions of nitric oxide from motor vehicles which reacted to create temporary ozone sinks.

The results of the mobile monitoring survey indicate that pollutants due to vehicle exhaust emissions were above detectable limits and show peaks in areas with higher traffic density such as Canmore, Exshaw, Banff and along the Trans-Canada Highway. Concentrations of these pollutants in the Bow Corridor were typical of small urban locations in Alberta. Brief peaks in air pollutant concentrations, which may be attributed to industrial activities, were evident in the Exshaw area. Alberta Environmental Protection guidelines were not exceeded during the mobile monitoring study.

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ABBREVIATIONS

AQML - Air Quality Monitoring Laboratory

SO_2 - sulphur dioxide

THC - total hydrocarbons

O_3 - ozone

NO - nitric oxide

NO_2 - nitrogen dioxide

NO_x - total oxides of nitrogen (the sum of NO and NO_2)

CO - carbon monoxide

ppm - parts per million by volume

ppb - parts per billion by volume

MOBILE MONITORING SURVEY OF THE BOW CORRIDOR MARCH 2 AND 12, 1994

1. INTRODUCTION

In response to a request from the Environmental Advisory Committee of the Canmore Town Council, Alberta Environmental Protection conducted an air quality monitoring study in the Bow Corridor and specifically, the Exshaw, Canmore and Banff communities. The design of the monitoring study was developed in cooperation with the Canmore Town Council and local environmental groups. The study involved two components:

(1) A mobile monitoring survey for carbon monoxide, oxides of nitrogen (total oxides of nitrogen, nitric oxide and nitrogen dioxide), ozone, hydrogen sulphide, sulphur dioxide and total hydrocarbons. This component of the study consisted of two mobile monitoring survey days from the Calgary city limits to the Town of Banff with more intensive monitoring conducted in the Towns of Exshaw, Canmore and Banff.

(2) A stationary monitoring study for inhalable (< 10 microns) particles in the Town of Canmore. Inhalable particulates were collected for a 13 consecutive day period from March 1 to 13. Additional samples were collected from March 14 to May 10 on days when winds had a southeast component. These samples were analyzed for chemicals which were considered indicative of industrial sources in Exshaw, wood smoke and vehicle exhaust.

The objective of the monitoring study is to determine the level of specific air pollutants in the Bow Corridor (Exshaw, Canmore and Banff region) with respect to local air quality issues. Air quality issues of concern in the region as identified by the Environmental Advisory Committee include:

(1) smoke from local sources, including fire places and slash burning;
(2) automobile emissions from the Trans-Canada Highway;
(3) haze and dust from the industries in Exshaw;
(4) the apparent rise in asthma cases in school children; and
(5) the characteristics and behaviour of the air flow in the valley.

The first three air quality issues will be addressed by this monitoring study. The mobile monitoring component will assess automobile emissions and emissions from industries in Exshaw. The inhalable particulate component will address smoke from regional sources, and further assess automobile emissions and emissions from industries in Exshaw.

The results of the mobile monitoring component are presented in this report. The results of the inhalable particulate study are presented in the report entitled *"Air Quality Survey of Inhalable Particulates in the Town of Canmore - March 1 to May 10, 1994"*.

2. DESCRIPTION OF THE MONITORING SURVEY

2.1 THE AIR QUALITY MONITORING LABORATORY (AQML)

The Alberta Environmental Protection Air Quality Monitoring Laboratory (AQML) is a recreational vehicle modified to monitor and analyze a comprehensive set of air pollutants. These pollutants include sulphur compounds (sulphur dioxide and hydrogen sulphide), total hydrocarbons (reactive plus non-reactive), oxides of nitrogen (total, nitric oxide and nitrogen dioxide), ozone and carbon monoxide. Air quality monitoring by this method can be undertaken either while the vehicle is stationary or in motion. The AQML is used: (1) for special regional monitoring surveys in response to requests from the public or municipalities; (2) to support investigations activities of the Department; and (3) for emergency response to uncontrolled releases.

The mobile laboratory is equipped with a combined navigational and data acquisition computer. Its design enables analog and digital outputs from the instruments and transducers to be stored conveniently for later data analysis. Data are gathered as a function of distance or time. Analog inputs are averaged using ten scans to build each reported value. At a pre-selected time and distance interval, the Cartesian co-ordinate (x and y), time and data are stored and printed to a peripheral device. In emergency response situations, data reduction and analysis can be performed in the field enabling the operator to check the validity of the data and to report the essential data during or immediately following a survey.

2.2 THE MONITORING SURVEY

Air quality monitoring, using the AQML, was conducted on March 2 (Wednesday) and March 12 (Saturday), 1994 in the Bow Corridor. The mobile monitoring survey days lasted from 7 to 11 hours and were conducted between 10 AM and 9 PM MST. During these survey days, air quality was monitored: (1) along Highway #1 from Calgary to Canmore and Canmore to Banff; (2) along Highway #1A from Canmore to Exshaw and from Exshaw to Highway #1X; and (3) in the Towns of Exshaw, Canmore and Banff. An effort was made to monitor on days when wind speeds were relatively low so that pollutant dispersion, on a regional basis, would be at a minimum. The routes for the individual surveys are presented in Figures 2.1 to 2.2.

During this monitoring survey, the AQML was equipped to monitor carbon monoxide (CO), total oxides of nitrogen (NO_x), nitric oxide (NO), nitrogen dioxide (NO_2), ozone (O_3), hydrogen sulphide (H_2S), sulphur dioxide (SO_2) and total hydrocarbons (THC). Data gathered by the AQML were collected in digital and graphical (line chart) form. These data were collected using averaged time intervals of 10, 30 and 60 seconds. Each interval or sample is an average of the ten subsamples.

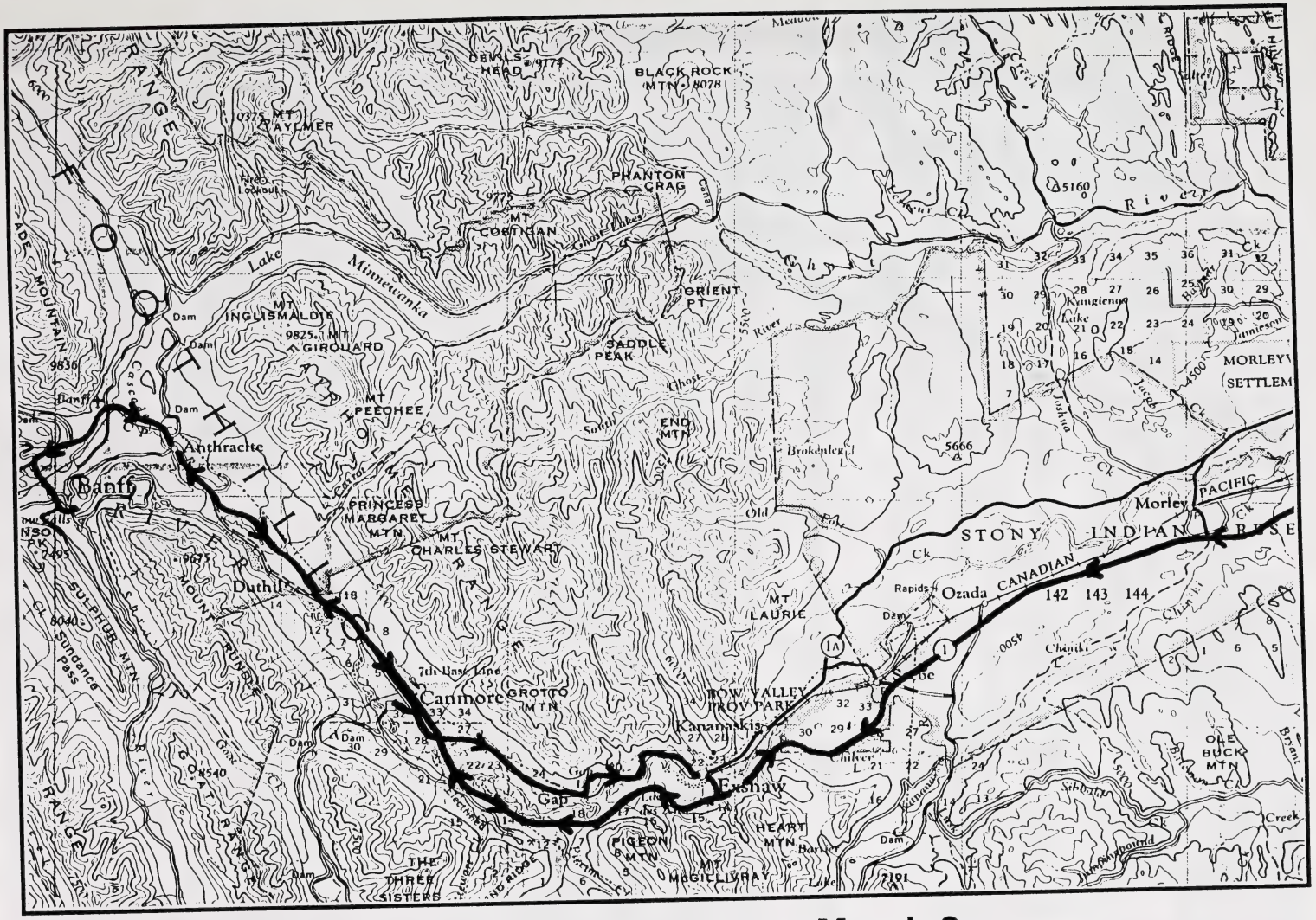

Figure 2.1 Mobile Monitoring Unit Route on March 2.

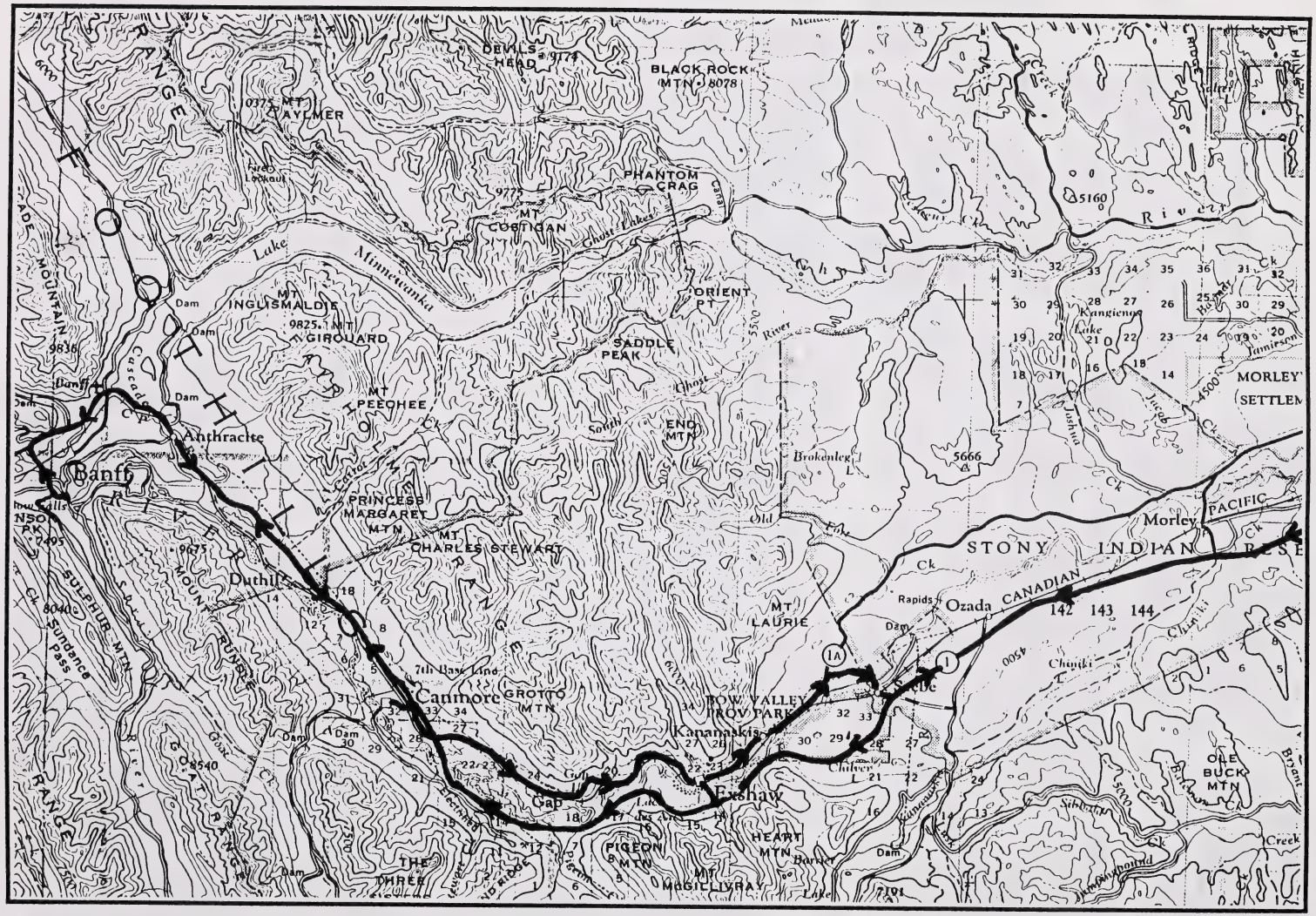

Figure 2.2 Mobile Monitoring Unit Route on March 12.

Many average readings include short peaks from exhaust emissions of oncoming and overtaking vehicles. This was especially evident on the $NO/NO_x/NO_2$ analyzer due to its quick response. Since the $NO/NO_x/NO_2$ is a cycling analyzer, the NO parameter may occasionally be higher than the NO_x parameter depending on which part of the cycle the analyzer is in when encountering a narrow peak or a series of narrow peaks during the averaging period. Missing data blocks are primarily due to interference from exhaust from the AQML.

Survey days were started with zero and upscale span checks on all analyzers. Also zero checks were done on some analyzers at different times during the day. Times when an individual analyzer was switched to zero mode are indicated in the operator's notes. In cases where all analyzers were switched to zero mode, the data was removed. The accuracy and limit of detection specifications are indicated in Table 2.1. A brief description of the route travelled or other comments, taken from the operators field notes are contained in the appendix.

Table 2.1 Detection limit and accuracy specifications for parameters monitored by the AQML.

PARAMETER	DETECTION LIMIT	ACCURACY SPECIFICATION
Sulphur Dioxide	0.0001 ppm	± 0.001 ppm
Hydrogen Sulphide	0.0001 ppm	± 0.001 ppm
Carbon Monoxide	0.1 ppm	± 0.1 ppm
Nitric Oxide	0.0005 ppm	± 0.0005 ppm
Total Oxides of Nitrogen	0.0005 ppm	± 0.0005 ppm
Nitrogen Dioxide	0.0005 ppm	± 0.0005 ppm
Ozone	0.002 ppm	± 0.002 ppm
Total Hydrocarbons	0.005 ppm	± 0.2 ppm

Note: It is important to note that these are manufacturers specifications for analyzers while running in a stationary position, such as a lab bench with "clean" power supplied, and therefore are minimum specifications. It has been our experience, however, that these specifications degrade and output noise increases while the AQML is in motion and analyzers are running on generator power.

3. RESULTS OF THE MONITORING SURVEY

The Alberta Environmental Protection Air Quality Mobile Laboratory was utilized to conduct a survey of the Bow Corridor on two days in March, 1994. Air quality parameters monitored during this survey included: (1) carbon monoxide; (2) oxides of nitrogen (total, nitric oxide and nitrogen dioxide); (3) ozone; (4) sulphur compounds (hydrogen sulphide and sulphur dioxide); and (5) total hydrocarbons. Average and peak concentrations for these parameters are indicated in Tables 3.1 and 3.2 for specific sections of the route travelled by the AQML. Table 3.3 contains average and peak pollutant concentrations in the Bow Corridor and Calgary for the entire survey period.

3.1 CARBON MONOXIDE (CO)

Carbon monoxide, a common pollutant in urban areas, is a colourless, odourless gas. The majority of the CO found in urban air comes from incomplete combustion of carbon-based fuels. The primary source of urban CO is motor vehicles, with much smaller contributions from fireplaces, industrial sources, aircraft and natural gas combustion.

Figure 3.1 shows one-minute average CO concentrations as a function of time. CO concentrations generally show peaks when passing vehicles while on route. As is evident on the March 2 survey, CO concentrations were higher while monitoring in the Towns of Canmore and Banff. The highest average values recorded at Canmore and Banff on March 2 were 1.9 and 2.2 ppm, respectively. Higher CO concentrations were also observed in Exshaw, Canmore and Banff on March 12; however, concentrations were generally much lower than on March 2. Average concentrations in Canmore and Exshaw ranged from 0.4 to 0.8 ppm on the March 12 survey day. An average value of 1.0 ppm was recorded in Banff on March 12. The highest average concentrations were observed while monitoring in the Town of Banff on both survey days. Higher CO readings in the local towns are due to local vehicle traffic.

CO concentrations in the Bow Corridor on March 2 and 12 were lower than those recorded at the Calgary Downtown monitoring station based on one-hour averages. The average CO concentration in the Bow Corridor for the entire monitoring period was 20% less than downtown Calgary on March 2 and the same as downtown Calgary on March 12. Relatively low CO concentrations in Calgary on March 12 were due to: (1) less rush hour traffic on Saturday (March 12) as compared to Wednesday (March 2); and;(2) more rapid pollution dispersion by fairly brisk winds during the time of the survey (average wind speed about 20 km/hr).

The highest one-hour average CO concentrations recorded in the Bow Corridor on March 2 and 12 were 1.9 and 0.8 ppm, respectively. These values are substantially lower than the Alberta Environmental Protection guideline of 13 ppm.

Table 3.1 Average and maximum pollutant concentrations during mobile monitoring survey on March 2.

Route Description	CO (ppm)		NO_2 (ppm)		NO (ppm)		NO_x (ppm)		O_3 (ppm)		H_2S (ppm)		SO_2 (ppm)		THC (ppm)	
	ave	max	ave	max	ave	max	ave	max	ave	max	ave	max	ave	max	ave	max
Hwy#1 (Calgary to Canmore) 11:36 to 12:20 PM	0.7	1.5	0.014	0.056	0.028	0.141	0.042	0.186	0.041	0.046	0.000	0.002	0.000	0.004	1.6	1.7
Canmore (Hwy #1A) 12:20 to 12:30 PM	0.8	1.1	0.008	0.013	0.009	0.029	0.017	0.022	0.043	0.045	0.000	0.001	0.001	0.000	1.6	1.7
Canmore (stationary on Hwy #1A) 12:30 to 1:30 PM	1.8	9.3	0.007	0.025	0.006	0.029	0.013	0.042	0.043	0.046	0.000	0.001	0.000	0.000	1.8	2.8
Canmore (downtown and residential) 1:30 to 1:45 PM	1.0	1.8	0.015	0.022	0.014	0.030	0.028	0.050	0.038	0.044	0.000	0.001	0.000	0.001	1.8	2.2
Canmore (downtown and residential) 2:35 to 3:11 PM	1.3	6.1	0.008	0.019	0.008	0.049	0.016	0.044	0.042	0.047	0.000	0.001	0.000	0.001	1.8	2.4
Canmore (downtown to Hwy #1A) 4:46 to 5:11 PM	1.9	3.6	0.015	0.031	0.016	0.040	0.031	0.069	0.033	0.039	0.000	0.001	0.000	0.001	1.9	2.5
Hwy #1 (Canmore to Banff) 5:11 to 5:33 PM	1.2	4.4	0.019	0.026	0.028	0.078	0.047	0.119	0.027	0.039	0.000	0.001	0.000	0.002	1.6	2.2
Banff (in town) 5:33 to 5:54 PM	2.2	11.5	0.025	0.077	0.027	0.056	0.052	0.097	0.031	0.040	0.000	0.001	0.000	0.002	1.8	2.6
Hwy #1 (Banff to Canmore) 5:54 to 6:11 PM	0.8	1.5	0.021	0.035	0.035	0.070	0.056	0.105	0.027	0.037	0.000	0.001	0.000	0.001	1.5	1.6
Hwy #1A (Canmore to Exshaw) 6:11 to 6:35 PM	0.7	1.2	0.006	0.019	0.006	0.023	0.012	0.027	0.037	0.040	0.000	0.001	0.000	0.000	1.5	1.7
Exshaw (Hwy #1A) 6:35 to 6:46 PM	0.7	0.8	0.013	0.018	0.004	0.008	0.017	0.021	0.027	0.033	0.000	0.001	0.000	0.001	1.7	1.7
Hwy #1 (Exshaw to Canmore) 6:46 to 7:03 PM	0.8	0.6	0.008	0.013	0.004	0.011	0.012	0.023	0.035	0.039	0.000	0.001	0.000	0.000	1.7	1.7
Canmore (townsite) 7:53 to 8:05 PM	1.0	3.9	0.009	0.021	0.006	0.022	0.015	0.040	0.034	0.036	0.000	0.001	0.000	0.001	1.7	1.8
Hwy #1 (Canmore toward Calgary) 8:05 to 8:25 PM	0.5	0.7	0.012	0.019	0.010	0.021	0.022	0.034	0.033	0.037	0.000	0.001	0.000	0.001	1.6	1.7

Table 3.2 Average and maximum pollutant concentrations during mobile monitoring survey on March 12.

Route Description	CO (ppm)		NO_2 (ppm)		NO (ppm)		NO_x (ppm)		O_3 (ppm)		H_2S (ppm)		SO_2 (ppm)		THC (ppm)	
	ave	max	ave	max	ave	max	ave	max	ave	max	ave	max	ave	max	ave	max
Hwy #1 (Calgary to Exshaw) 10:45 to 11:43 AM	0.4	2.3	0.006	0.028	0.033	0.171	0.039	0.186	0.048	0.051	0.001	0.003	0.000	0.003	1.8	1.9
Exshaw (residential) 11:43 to 12:18 PM	0.8	3.3	0.034	0.159	0.098	0.281	0.132	0.342	0.034	0.049	0.002	0.027	0.007	0.073	1.9	2.7
Hwy #1A (Mt. Sparrowhawk Rd. to Baymag Pl. entrance) 12:18 to 12:28 PM	0.3	1.2	0.009	0.017	0.042	0.066	0.051	0.068	0.047	0.049	0.000	0.001	0.000	0.000	1.8	1.9
Exshaw (residential) 12:28 to 12:53 PM	0.8	3.5	0.023	0.060	0.148	0.461	0.171	0.525	0.035	0.051	0.001	0.007	0.006	0.031	2.0	2.6
Hwy #1A (Exshaw to Hwy #1X) 12:53 to 1:03 PM	0.9	2.6	0.018	0.040	0.079	0.102	0.097	0.146	0.045	0.051	0.001	0.001	0.000	0.002	1.9	2.0
Hwy #1X to Hwy #1 1:03 to 1:23 PM	0.1	2.3	0.006	0.011	0.056	0.141	0.052	0.117	0.046	0.052	0.000	0.001	0.000	0.002	1.7	2.3
Hwy #1 (Hwy #1X to Canmore) 1:23 to 1:47 PM	0.3	0.9	0.012	0.028	0.044	0.062	0.056	0.092	0.046	0.051	0.000	0.001	0.000	0.001	1.8	1.9
Canmore (in town) 1:47 to 2:03 PM	0.4	2.3	0.005	0.016	0.050	0.060	0.055	0.072	0.047	0.049	0.000	0.001	0.000	0.000	1.8	2.0
Banff (in town) 4:00 to 4:30 PM	1.0	2.9	0.019	0.069	0.032	0.116	0.051	0.146	0.041	0.047	0.001	0.002	0.000	0.002	1.9	2.3
Hwy #1 (Banff to Canmore) 4:30 to 4:45 PM	0.5	1.1	0.023	0.049	0.034	0.071	0.057	0.121	0.038	0.043	0.001	0.002	0.002	0.010	1.7	1.9
Canmore (in town) 4:45 to 5:02 PM	0.7	2.2	0.013	0.032	0.021	0.065	0.034	0.092	0.039	0.042	0.001	0.002	0.000	0.001	1.7	2.0
Hwy #1A (Canmore to Exshaw) 5:02 to 5:14 PM	0.3	0.6	0.003	0.005	0.002	0.004	0.005	0.011	0.043	0.044	0.000	0.001	0.000	0.000	1.6	1.8
Exshaw (residential) 5:14 to 5:41 PM	0.6	2.5	0.019	0.119	0.079	0.225	0.098	0.282	0.031	0.042	0.001	0.003	0.004	0.019	1.9	2.4
Hwy #1A and #1X (Exshaw to Hwy #1) 5:41 to 5:51 PM	0.2	0.3	0.015	0.021	0.006	0.016	0.021	0.038	0.031	0.042	0.001	0.001	0.001	0.004	1.8	2.0

Table 3.3 Air pollutant concentrations in the Bow Corridor and Calgary on March 2 and 12.

Pollutant	March 2		March 12	
	Bow Corridor	Calgary[1]	Bow Corridor	Calgary[1]
Peak One-Minute Average Concentrations (ppm)				
CO	11.5	10.2	3.5	5.8
NO_2	0.077	0.067	0.159	0.035
NO	0.141	0.135	0.461	0.020
NO_x	0.186	0.202	0.525	0.055
O_3	0.047	0.046	0.051	0.049
H_2S	0.002	0.004	0.027	0.002
SO_2	0.004	0.008	0.073	0.003
THC	2.8	4.4	2.7	2.3
Peak One-Hour Average Concentrations (ppm)				
CO	1.9	2.9	0.8	0.9
NO_2	0.022	0.056	0.019	0.031
NO	0.025	0.079	0.097	0.007
NO_x	0.047	0.135	0.116	0.038
O_3	0.042	0.044	0.045	0.048
H_2S	0.000	0.001	0.001	0.000
SO_2	0.000	0.006	0.005	0.002
THC	1.8	2.4	1.9	2.0
Average Concentrations for the Monitoring Period (ppm)				
CO	1.2	1.5	0.6	0.6
NO_2	0.009	0.033	0.013	0.024
NO	0.016	0.028	0.058	0.006
NO_x	0.025	0.061	0.071	0.030
O_3	0.037	0.041	0.040	0.046
H_2S	0.000	0.000	0.001	0.000
SO_2	0.000	0.004	0.002	0.001
THC	1.7	2.1	1.8	1.9

[1] Calgary data for: CO, NO_2, NO, NO_x and THC are from the Calgary Downtown Monitoring Station; H_2S and SO_2 are from the Calgary Industrial Monitoring Station; and O_3 are from the Springbank Airport (20 km west-northwest of downtown Calgary).

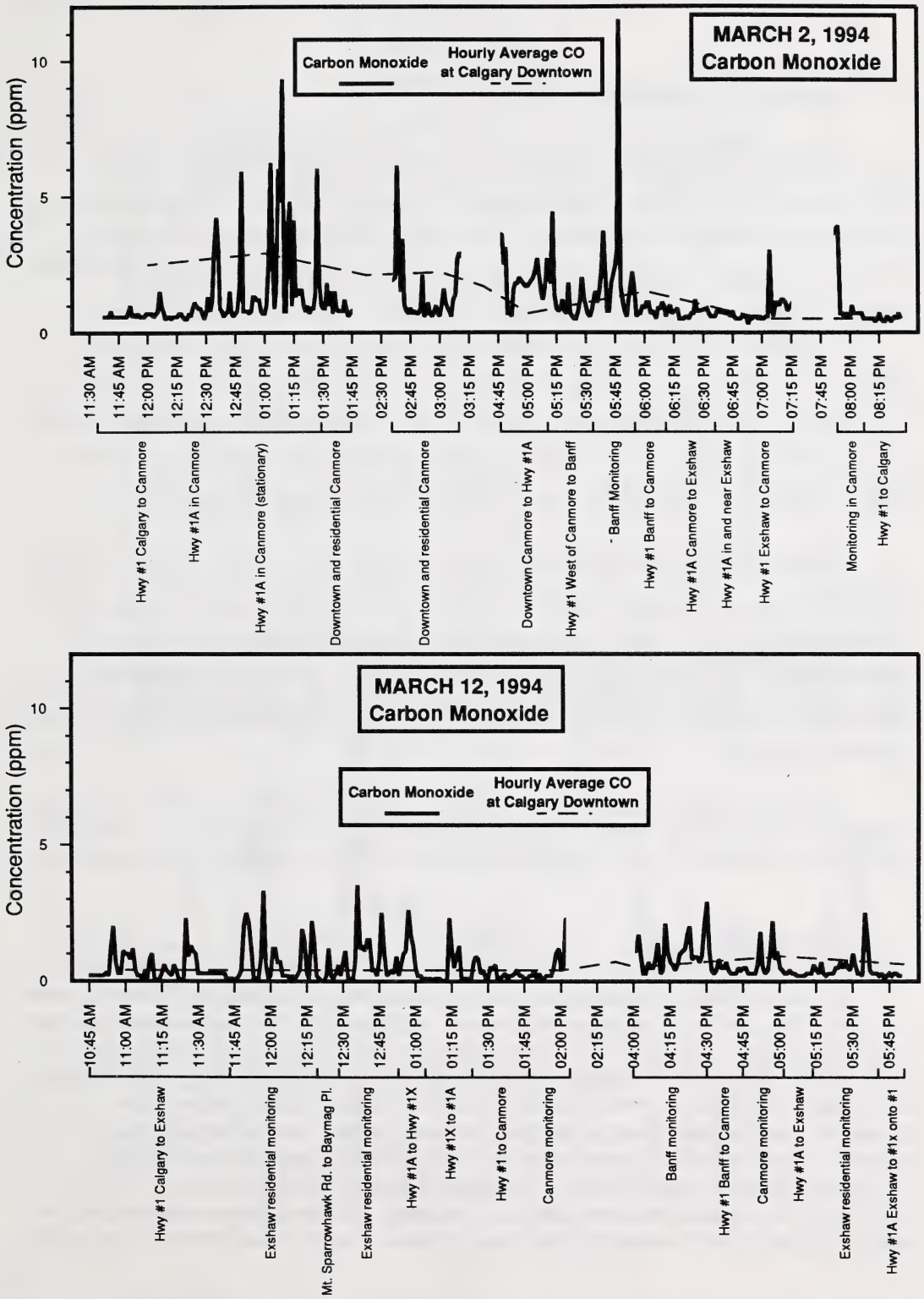

Figure 3.1 One-Minute Average Carbon Monoxide Concentrations on March 2 and 12.

3.2 OXIDES OF NITROGEN (NO_x)

Nitrogen dioxide is a reddish-brown gas with a pungent odour which is partially responsible for the brownish discolouration of the lower atmosphere in urban locations. In Alberta, about 38% of nitrogen dioxide emissions are produced by the oil and gas industry while 29% are due to transportation (aircraft and vehicles) and 16% due to power plants. Smaller sources of nitrogen dioxide include natural gas combustion, heating fuel combustion, and forest fires. The largest urban source of nitrogen dioxide is emissions from motor vehicles.

The highest oxides of nitrogen concentrations were observed on the Trans-Canada Highway (0.021 ppm for NO_2) and in the Town of Banff (0.022 ppm for NO_2) on March 2. Average NO_2 values ranged from 0.007 to 0.015 ppm in Canmore on March 2. On March 12, the highest NO_2 values were observed in and near Exshaw where average values from 0.018 to 0.030 ppm were recorded. Relatively high oxides of nitrogen values were also recorded in Banff (0.019 ppm for NO_2) and on the Trans-Canada Highway (0.023 ppm for NO_2) on March 12. One-minute average NO_x, NO and NO_2 concentrations are presented in Figure 3.2.

Concentrations of oxides of nitrogen were lower in the Bow Corridor than at the Calgary downtown station on March 2. However, on March 12 average oxides of nitrogen concentrations were higher in the Bow Corridor than downtown Calgary. Higher concentrations in the Bow Corridor on March 12 were due to vehicle exhaust emissions specifically in the Towns of Exshaw and Banff and on the Trans-Canada Highway. Oxides of nitrogen concentrations in Calgary on March 12 were relatively low due to less weekend traffic (Saturday) and a brisk wind which enhanced pollutant dispersion. Also, more weekend traffic would be expected in the Bow Corridor on March 12.

The Alberta Environmental Protection one-hour average guideline for NO_2 is 0.210 ppm. Maximum one-hour average concentrations recorded during the monitoring survey were 0.022 and 0.019 ppm on March 2 and 12, respectively. These values are about 10% of the guideline.

3.3 OZONE (O_3)

At normal outdoor concentrations, ozone is a colourless, odourless gas. However, ozone does have a characteristic sharp odour when at very high concentrations, such as those associated with lightning storms. Unlike many other pollutants, ozone is not emitted directly by man's activities, but is generated by a photochemical reaction between ultra-violet light from the sun with oxides of nitrogen (NO_x) and volatile organic compounds (VOCs). Ozone is also transported to ground level from the upper atmosphere by natural meteorological mixing processes. Ozone and ozone precursors, such as NO_x and VOCs, may also be carried from upwind sources such as urban centres and industrial complexes. A major source of VOCs in rural areas is natural emissions from trees and vegetation. In Alberta, ozone concentrations are generally higher at rural locations than at urban locations. This is because ozone is destroyed by

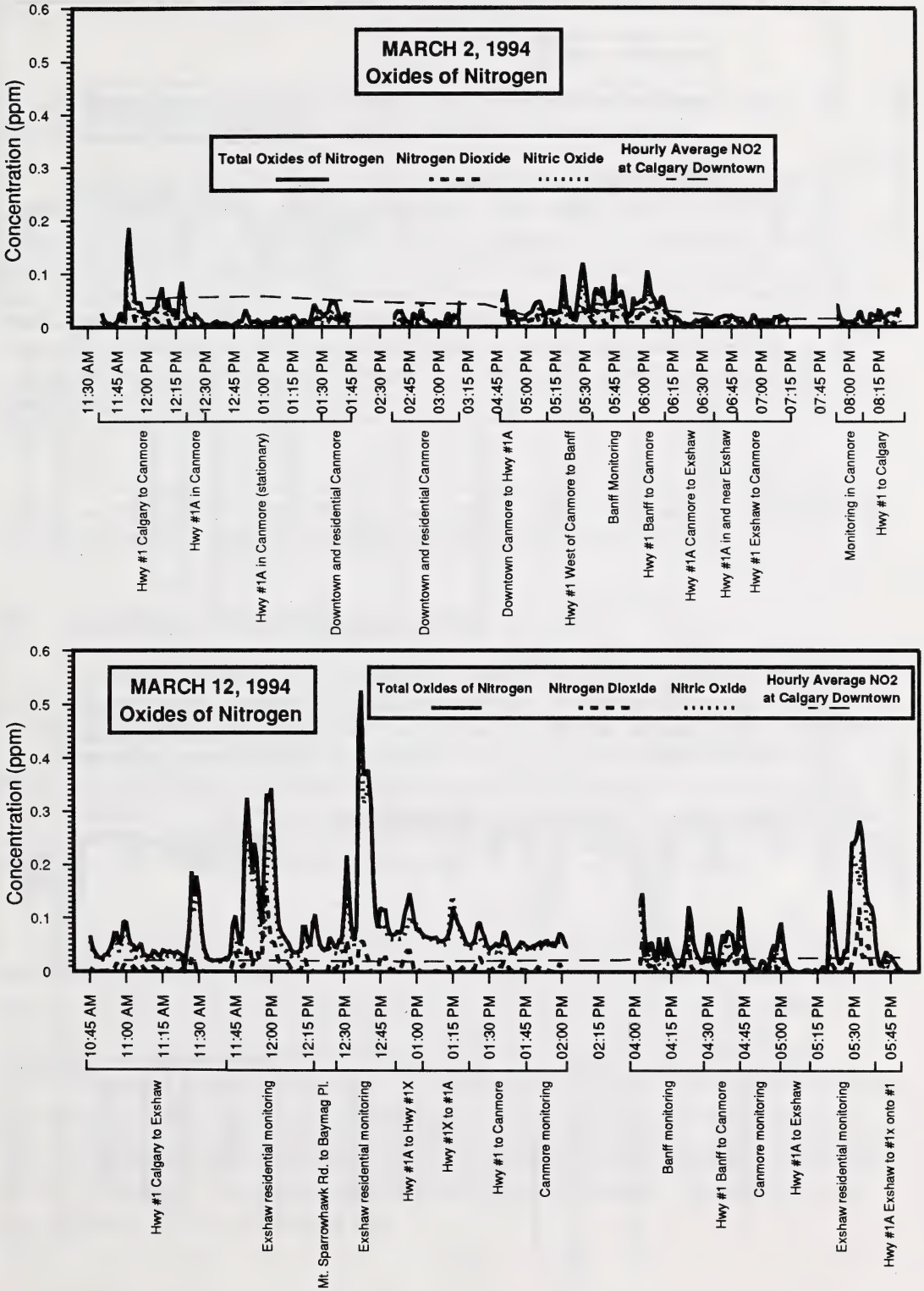

Figure 3.2 One-Minute Average Oxides of Nitrogen Concentrations on March 2 and 12.

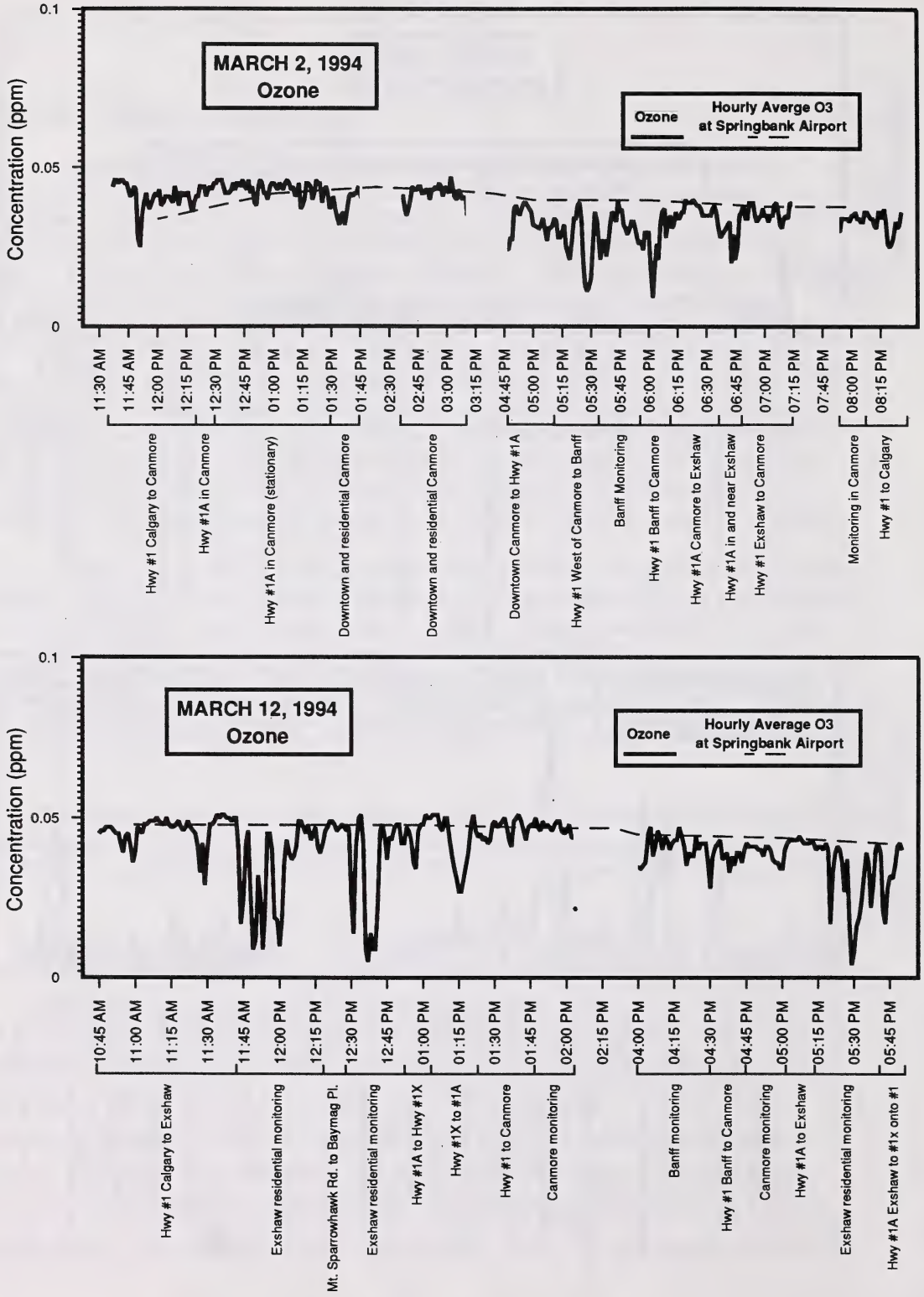

Figure 3.3 One-Minute Average Ozone Concentrations on March 2 and 12.

the reaction of ozone with nitric oxide (from vehicle exhaust) to form nitrogen dioxide. The major source of nitric oxide in urban locations is vehicle exhaust emissions.

One-minute average O_3 values for the Bow Corridor are presented in Figure 3.3. One-hour average O_3 concentrations from the Springbank Airport (20 km west-northwest of downtown Calgary) are included on this graph for comparison. O_3 concentrations in the Bow Corridor followed the same general pattern as that for the Springbank Airport on both survey days. Frequent dips in O_3 concentrations were observed on both survey days. These dips are especially evident in the local towns (Canmore, Exshaw and Banff) where the traffic density is higher. These occurrences were likely due to exhaust emissions from vehicles. Nitric oxide emitted by vehicular traffic creates a temporary sink for O_3. These incidences would also lead to lower average O_3 values recorded by the AQML. O_3 monitored in the Bow Corridor likely results from natural "background" O_3.

The maximum one-hour average O_3 concentrations observed in the Bow Corridor on March 2 and 12 were 0.042 and 0.045 ppm, respectively. These values are just over half of the Alberta Environmental Protection guideline of 0.082 ppm as a one-hour average.

3.4 SULPHUR COMPOUNDS (SO_2 and H_2S)

In rural areas of Alberta, the predominant sources of man-made sulphur compounds are the oil and gas operations, power plants and pulp and paper industries. Man-made sources of SO_2 and H_2S include sour gas plants, and sour gas and oil batteries. Pulp and paper mills are also an important source of sulphur compounds such as SO_2, H_2S and sulphur mercaptans. Sulphur compounds are found naturally in coal, natural gas, oil, sulphur hot springs, sloughs, swamps and lakes. H_2S is also produced under anaerobic conditions in the decomposition of sulphur-containing bacteria. Decomposition of sulphur-containing bacteria is responsible for the rotten egg odour commonly associated with marshes, sewers, and sewage lagoons.

Figure 3.4 shows one-minute average SO_2 and H_2S concentrations. SO_2 and H_2S concentrations were below the detection limit of the continuous air quality instruments aboard the AQML most of the time on March 2. However, episodes of H_2S and SO_2 above the detection limit were evident in the Exshaw area on March 12. The most notable of these incidents was observed at approximately 12:00 PM MST where one-minute average H_2S and SO_2 concentrations peaked at 0.027 and 0.073 ppm, respectively. Other sulphur compound peaks were also recorded at about 12:40 PM and 05:30 PM. Plume impingement from the local cement manufacturing facility was observed at these times. Even though these peaks were relatively high, the resulting one-hour average concentrations for both pollutants were much lower than the Alberta Environmental Protection one-hour average guidelines of 0.170 and 0.010 ppm for SO_2 and H_2S, respectively. These peaks in sulphur compound concentrations were associated with local industrial activity in the Exshaw area.

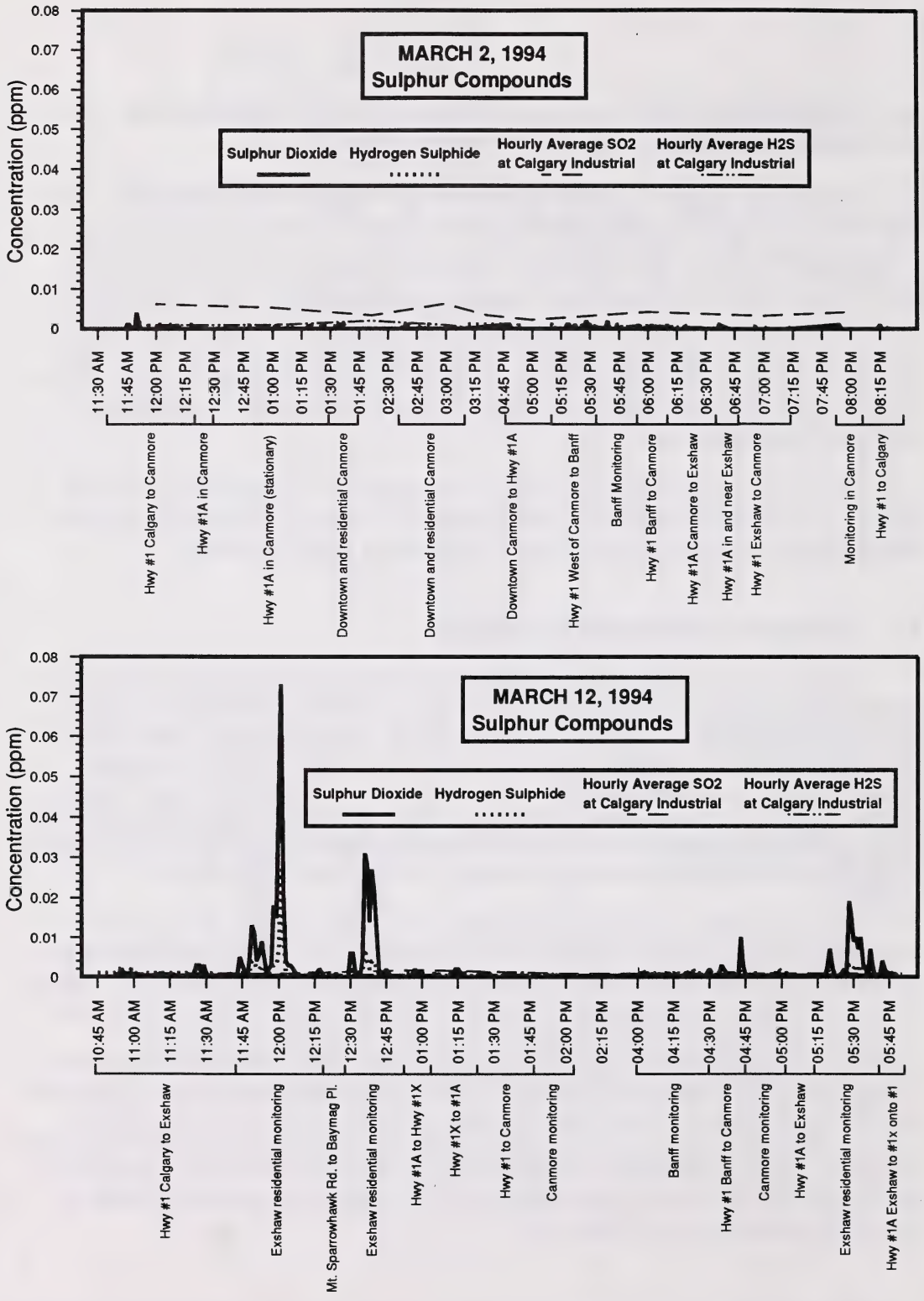

Figure 3.4 One-Minute Average Sulphur Dioxide Concentrations on March 2 and 12.

3.5 TOTAL HYDROCARBONS (THC)

The term "total hydrocarbons" refers to the combined concentration of two broad categories of organic compounds: reactive and non-reactive hydrocarbons. The non-reactive component is primarily methane, a colourless, odourless gas that is naturally present in the atmosphere at concentrations of 1.5 to 2 ppm. The reactive component is essentially organic compounds other than methane that are usually present in much lower concentrations. Reactive hydrocarbons are especially important because they will react with oxides of nitrogen in the presence of sunlight to form ozone.

A major source of hydrocarbons in Alberta is automobile emissions. There are also many industrial and natural sources of hydrocarbons. The predominant industrial sources of hydrocarbons are gasoline processing, marketing and storage tanks, and natural gas combustion. Natural sources of hydrocarbons include trees and other vegetation, and the decay of animal and plant material.

Figure 3.5 indicates one-minute average THC concentrations for the monitoring survey days on March 2 and 12. Frequent THC peaks indicated in this figure correspond with passing and oncoming vehicles. Average total hydrocarbon (THC) concentrations were 1.7 to 1.8 ppm on March 2 and 12, respectively. These values are typical of those that would be expected in the "background" environment. Average THC values for March 2 and 12 at the Calgary Downtown station were 2.1 and 1.9 ppm, respectively. The highest THC values were observed in the local communities of Exshaw, Canmore and Banff. The major man-made source of hydrocarbons in the region is vehicle exhaust emissions. Local industry in Exshaw may also be a source of some hydrocarbons. This is illustrated by elevated THC concentrations observed in Exshaw between 12:00 and 12:30 PM on March 12. These elevated concentrations are coincident with elevated H_2S and SO_2 values indicated in Section 3.4. The maximum one-minute average THC value observed during the monitoring period was 2.8 ppm. This is compared to a value of 4.4 ppm recorded at the Calgary Downtown monitoring station.

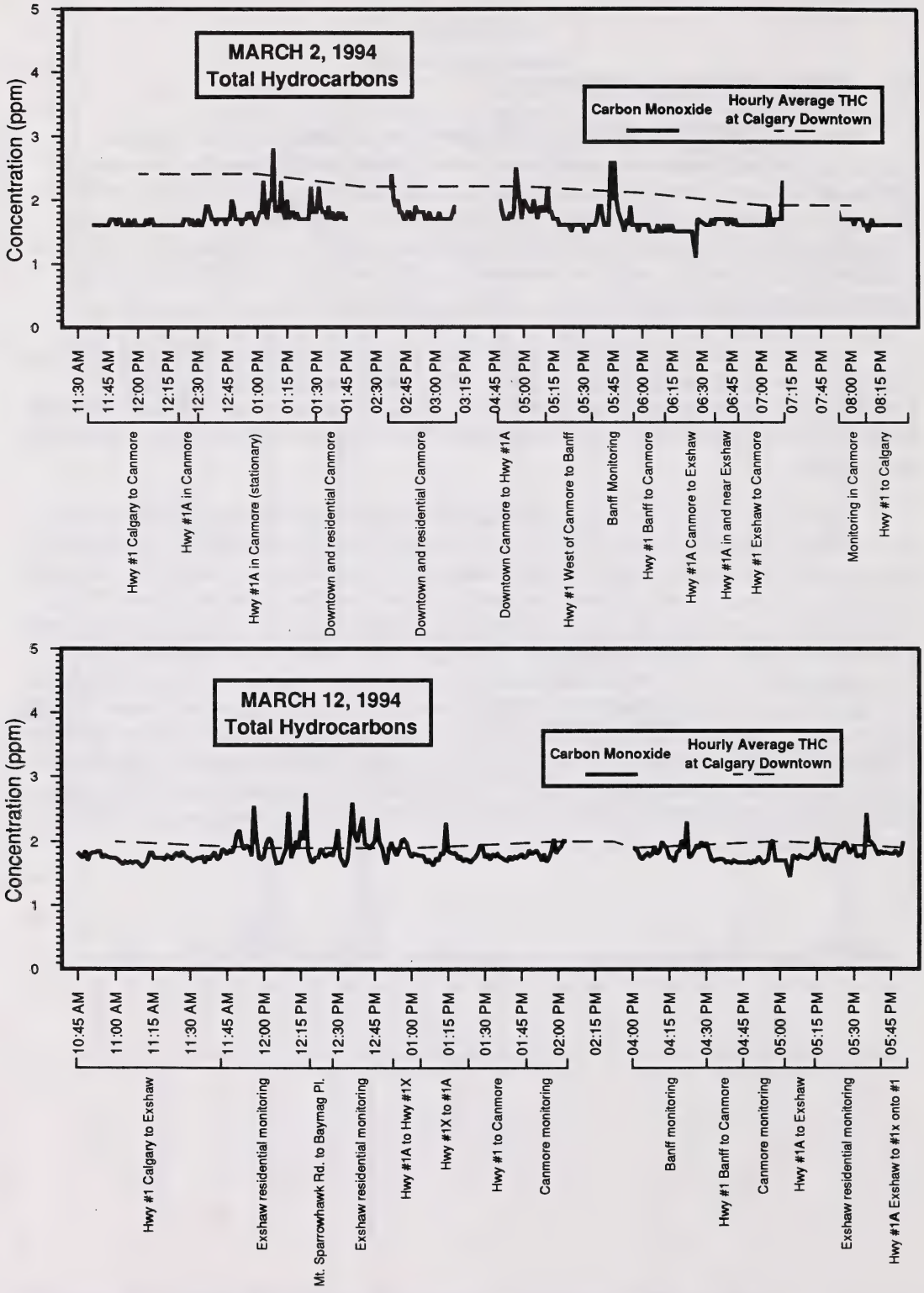

Figure 3.5 One-Minute Average Total Hydrocarbon Concentrations on March 2 and 12.

4. CONCLUSIONS

The following are the conclusions resulting from the mobile monitoring survey conducted in the Bow Corridor.

(1) Concentrations of carbon monoxide were generally greater in the communities of Exshaw, Canmore and Banff than on the local highways. Oxides of nitrogen concentrations were the highest on the Trans-Canada Highway and in Exshaw, Canmore and Banff. Higher concentrations of carbon monoxide and oxides of nitrogen in local communities were due to a higher traffic density in these towns. Nitric oxide concentrations on the highway may be greater because of more complete combustion of gasoline by automobiles and exhaust from diesel truck traffic.

(2) Ozone concentrations were, on average, similar to what would be expected in the "background" environment. Frequent dips below expected background concentrations were due to nitric oxide emissions from passing and oncoming motor vehicles.

(3) Concentrations of sulphur compounds were below the instrument detection limit most of the time while monitoring in the Bow Corridor. The exception to this was on March 12 when episodes of elevated hydrogen sulphide and sulphur dioxide concentrations were observed when monitoring in Exshaw. Plume impingement from the cement manufacturing kilns was observed during these episodes. Therefore, relatively high sulphur dioxide and hydrogen sulphide readings were attributed to local industry. The Alberta Environmental Protection guidelines for hydrogen sulphide and sulphur dioxide were not exceeded during the monitoring survey.

(4) Total hydrocarbon concentrations were highest in the towns of Banff, Canmore and Exshaw. With the exception of Exshaw, this is primarily due to vehicle emissions. In Exshaw, short peaks in hydrocarbon concentrations were evident at times when sulphur compounds also showed a brief increase. Hydrocarbons monitored during these occasions may be due to industrial activities in the Exshaw area.

APPENDIX:

DATA COLLECTED BY THE AIR QUALITY MONITORING LABORATORY

One-Minute Average Pollutant Concentrations from Mobile Monitoring Survey of the Bow Corridor: March 2, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
11:30 AM	no data	no data	no data	no data	no data	no data	no data	no data	
11:31 AM	no data	no data	no data	no data	no data	no data	no data	no data	
11:32 AM	no data	no data	no data	no data	no data	no data	no data	no data	
11:33 AM	no data	no data	no data	no data	no data	no data	no data	no data	
11:34 AM	no data	no data	no data	no data	no data	no data	no data	no data	
11:35 AM	no data	no data	no data	no data	no data	no data	no data	no data	
11:36 AM	no data	no data	no data	no data	no data	no data	no data	no data	
11:37 AM	0.6	.044	1.6	.000	.012	.026	.011	.000	**Highway #1 West to Canmore 11:36 AM to 12:20 PM.**
11:38 AM	0.6	.046	1.6	.000	.006	.016	.009	.000	
11:39 AM	0.6	.046	1.6	.000	.004	.011	.005	.000	
11:40 AM	0.6	.045	1.6	.000	.006	.008	.002	.000	
11:41 AM	0.8	.046	1.6	.000	.005	.008	.003	.000	
11:42 AM	0.6	.046	1.6	.000	.002	.006	.002	.000	
11:43 AM	0.6	.045	1.6	.000	.002	.006	.004	.000	
11:44 AM	0.6	.045	1.6	.000	.002	.008	.003	.000	
11:45 AM	0.6	.043	1.6	.001	.005	.010	.001	.000	
11:46 AM	0.6	.041	1.7	.001	.017	.024	.003	.001	
11:47 AM	0.6	.042	1.7	.000	.019	.027	.003	.001	
11:48 AM	0.6	.044	1.7	.000	.009	.017	.003	.000	
11:49 AM	0.6	.043	1.6	.000	.008	.019	.008	.000	
11:50 AM	0.8	.028	1.7	.004	.088	.148	.056	.002	
11:51 AM	1.0	.025	1.7	.002	.141	.186	.042	.002	
11:52 AM	0.6	.035	1.6	.000	.095	.125	.026	.001	
11:53 AM	0.7	.039	1.6	.000	.058	.089	.028	.000	
11:54 AM	0.6	.042	1.6	.000	.031	.048	.013	.000	
11:55 AM	0.7	.038	1.7	.000	.018	.045	.012	.000	
11:56 AM	0.6	.037	1.6	.000	.030	.046	.013	.001	
11:57 AM	0.6	.039	1.6	.000	.030	.045	.009	.000	
11:58 AM	0.6	.041	1.7	.000	.017	.027	.006	.000	
11:59 AM	0.7	.042	1.6	.000	.012	.024	.007	.000	
12:00 PM	0.7	.041	1.6	.000	.023	.030	.004	.001	
12:01 PM	0.7	.043	1.6	.000	.014	.023	.007	.000	<EXSHAW TURNOFF
12:02 PM	0.7	.038	1.6	.000	.015	.028	.010	.001	
12:03 PM	0.6	.039	1.6	.000	.020	.030	.009	.001	
12:04 PM	0.7	.041	1.7	.000	.016	.035	.017	.000	
12:05 PM	0.8	.041	1.6	.000	.021	.036	.012	.001	
12:06 PM	1.5	.041	1.7	.000	.041	.053	.010	.001	
12:07 PM	1.0	.040	1.7	.000	.041	.062	.016	.001	<LAFARGE PLANT,20 KM FROM
12:08 PM	0.8	.039	1.6	.000	.069	.075	.003	.001	CANMORE
12:09 PM	0.5	.044	1.6	.000	.032	.036	.000	.000	
12:10 PM	0.6	.042	1.6	.000	.018	.038	.015	.001	
12:11 PM	0.6	.038	1.6	.001	.035	.055	.017	.001	
12:12 PM	0.5	.042	1.6	.000	.026	.036	.006	.000	

One-Minute Average Pollutant Concentrations from Mobile Monitoring Survey of the Bow Corridor: March 2, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
12:13 PM	0.6	.042	1.6	.000	.021	.028	.003	.000	
12:14 PM	0.6	.041	1.6	.000	.026	.035	.005	.000	
12:15 PM	0.6	.042	1.6	.000	.015	.023	.006	.000	
12:16 PM	0.7	.042	1.6	.000	.010	.017	.005	.000	
12:17 PM	0.7	.038	1.6	.000	.064	.065	.000	.001	<SOME NOX FROM HWY. TRAFFIC
12:18 PM	0.6	.036	1.6	.000	.062	.085	.020	.001	
12:19 PM	0.5	.039	1.6	.000	.039	.056	.012	.000	
12:20 PM	0.5	.041	1.6	.000	.020	.028	.004	.001	**Canmore monitoring on Hwy. #1A 12:20 to 12:30 PM.**
12:21 PM	0.7	.041	1.6	.000	.009	.020	.006	.001	<ENTER CANMORE
12:22 PM	0.6	.044	1.6	.000	.004	.019	.009	.000	
12:23 PM	0.9	.044	1.7	.000	.003	.014	.008	.000	<BENCHLANDS TRAIL AND HWY. 1A
12:24 PM	1.1	.044	1.7	.000	.003	.017	.013	.000	CONTINUE E.
12:25 PM	1.0	.041	1.7	.000	.029	.022	.000	.000	
12:26 PM	0.9	.043	1.6	.000	.019	.021	.000	.000	
12:27 PM	0.9	.044	1.7	.000	.009	.016	.002	.000	<U-TURN AT ESSO ON E. END
12:28 PM	0.7	.043	1.6	.000	.005	.013	.004	.000	AND CONT. W. ON HWY. 1A
12:29 PM	0.5	.045	1.6	.000	.002	.008	.002	.000	**Canmore stationary monitoring along Hwy #1A 12:30 to 1:30 PM.**
12:30 PM	0.7	.045	1.7	.000	.000	.006	.001	.000	<STOP FOR LUNCH AT B.P.
12:31 PM	1.3	.046	1.6	.000	.001	.006	.002	.000	
12:32 PM	0.8	.046	1.6	.000	.000	.005	.000	.000	
12:33 PM	1.1	.046	1.7	.000	.001	.005	.000	.000	
12:34 PM	3.0	.044	1.9	.000	.003	.007	.003	.000	<AQML AND TRAFFIC READINGS
12:35 PM	4.2	.042	1.9	.000	.001	.009	.003	.000	WHILE AT B.P.
12:36 PM	3.2	.042	1.8	.000	.003	.011	.005	.000	
12:37 PM	0.9	.042	1.7	.000	.003	.009	.003	.000	
12:38 PM	0.8	.043	1.7	.000	.001	.007	.003	.000	
12:39 PM	0.6	.045	1.6	.000	.002	.007	.004	.000	
12:40 PM	0.7	.043	1.7	.000	.001	.008	.004	.000	
12:41 PM	0.8	.045	1.7	.000	.000	.007	.003	.000	
12:42 PM	1.5	.045	1.7	.000	.000	.006	.002	.000	
12:43 PM	0.7	.044	1.7	.000	.000	.004	.002	.000	
12:44 PM	0.6	.046	1.6	.000	.000	.004	.003	.000	
12:45 PM	0.7	.044	1.7	.000	.000	.006	.001	.000	
12:46 PM	0.8	.043	1.7	.000	.002	.008	.003	.000	
12:47 PM	1.7	.046	2.0	.000	.000	.005	.002	.000	
12:48 PM	5.9	.042	1.9	.000	.020	.012	.000	.001	
12:49 PM	0.8	.044	1.7	.000	.018	.010	.000	.000	
12:50 PM	0.8	.039	1.7	.000	.015	.023	.006	.000	
12:51 PM	0.8	.038	1.7	.000	.029	.032	.004	.000	
12:52 PM	0.7	.044	1.6	.000	.028	.021	.000	.000	
12:53 PM	0.8	.046	1.7	.000	.012	.011	.000	.000	
12:54 PM	1.3	.045	1.7	.000	.006	.010	.000	.000	
12:55 PM	1.3	.042	1.8	.000	.004	.011	.003	.000	
12:56 PM	1.2	.042	1.7	.000	.003	.010	.006	.000	

One-Minute Average Pollutant Concentrations from Mobile Monitoring Survey of the Bow Corridor: March 2, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
12:57 PM	1.2	.040	1.8	.000	.001	.013	.006	.000	
12:58 PM	0.8	.044	1.7	.000	.004	.011	.008	.000	
12:59 PM	0.7	.045	1.6	.000	.000	.008	.005	.000	
01:00 PM	0.7	.045	1.7	.000	.001	.007	.003	.000	
01:01 PM	1.0	.044	1.8	.000	.001	.010	.005	.001	
01:02 PM	2.5	.043	1.8	.000	.002	.009	.004	.000	
01:03 PM	6.2	.045	2.3	.000	.005	.010	.003	.001	
01:04 PM	2.6	.044	1.8	.000	.007	.010	.001	.000	
01:05 PM	0.9	.043	1.7	.000	.005	.013	.004	.000	
01:06 PM	1.5	.045	2.0	.000	.009	.018	.006	.000	
01:07 PM	6.0	.046	2.0	.000	.005	.014	.008	.001	
01:08 PM	4.8	.045	2.8	.000	.003	.012	.006	.000	
01:09 PM	9.3	.043	1.8	.000	.006	.015	.005	.000	
01:10 PM	0.8	.044	1.9	.000	.002	.011	.006	.000	
01:11 PM	0.8	.041	1.8	.000	.005	.015	.005	.001	
01:12 PM	3.9	.042	2.3	.000	.006	.019	.009	.000	
01:13 PM	4.8	.045	1.8	.000	.005	.014	.007	.000	
01:14 PM	1.0	.037	1.7	.000	.005	.015	.007	.000	
01:15 PM	4.1	.038	2.0	.000	.008	.021	.008	.000	
01:16 PM	1.3	.040	1.7	.000	.009	.021	.011	.000	
01:17 PM	1.6	.045	1.8	.000	.005	.014	.005	.000	
01:18 PM	1.4	.045	1.8	.000	.003	.011	.005	.001	
01:19 PM	1.6	.044	1.7	.000	.002	.010	.004	.000	
01:20 PM	1.0	.040	1.8	.000	.006	.013	.002	.001	
01:21 PM	0.8	.042	1.7	.000	.011	.013	.001	.000	
01:22 PM	1.0	.046	1.7	.000	.006	.010	.002	.000	
01:23 PM	0.7	.045	1.7	.000	.005	.007	.001	.000	
01:24 PM	0.9	.045	1.7	.000	.006	.013	.005	.000	
01:25 PM	0.9	.039	1.7	.000	.019	.026	.004	.001	
01:26 PM	1.4	.043	1.7	.000	.014	.042	.025	.000	
01:27 PM	6.0	.044	2.2	.000	.015	.037	.021	.001	
01:28 PM	1.8	.042	1.8	.000	.009	.028	.015	.000	
01:29 PM	1.0	.037	1.8	.000	.009	.029	.016	.000	
01:30 PM	0.9	.038	1.8	.000	.008	.024	.013	.000	
01:31 PM	0.9	.041	2.2	.000	.007	.021	.012	.000	<DEPART TO AGT BLDG.
01:32 PM	1.8	.037	1.9	.000	.014	.024	.008	.000	**Canmore downtown and residential monitoring 1:30 to 1:45 PM.**
01:33 PM	1.0	.034	1.8	.000	.017	.028	.009	.001	
01:34 PM	1.5	.032	1.8	.001	.023	.040	.014	.001	
01:35 PM	0.7	.035	1.7	.001	.026	.050	.022	.000	
01:36 PM	1.5	.036	1.9	.001	.030	.045	.011	.001	<N. ON RAILWAY AVE.
01:37 PM	0.9	.032	1.7	.000	.028	.047	.016	.001	STOP AT TRACKS FOR TRAIN
01:38 PM	0.8	.036	1.8	.000	.015	.034	.017	.000	
01:39 PM	0.8	.041	1.7	.000	.007	.021	.010	.000	
01:40 PM	0.8	.042	1.7	.000	.003	.017	.007	.000	<E. ON RAILWAY AVE.

One-Minute Average Pollutant Concentrations from Mobile Monitoring Survey of the Bow Corridor: March 2, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
01:41 PM	1.2	.041	1.8	.000	.013	.011	.012	.000	
01:42 PM	0.9	.042	1.7	.000	.009	.027	.013	.000	<RAILWAY AVE. AND 17 ST.
01:43 PM	0.6	.042	1.8	.000	.006	.017	.008	.000	<N.W. ON 17 ST. FROM 8TH AVE.
01:44 PM	0.7	.044	1.7	.000	.006	.024	.015	.000	<W. ON FAIRHOLM DR.
01:45 PM	0.8	.041	1.7	.000	.005	.020	.012	.000	
02:30 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:31 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:32 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:33 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:34 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:35 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:36 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:37 PM	2.0	.041	2.2	.000	.007	.017	.005	.000	**Canmore residential and downtown monitoring 2:35 to 3:11 PM.**
02:38 PM	6.1	.037	2.4	.000	.013	.025	.009	.001	
02:39 PM	3.4	.035	2.0	.001	.016	.029	.013	.001	<W.ON BENCHLANDS TR. FROM 8 ST.
02:40 PM	1.5	.037	1.9	.000	.011	.028	.015	.001	
02:41 PM	3.4	.040	2.0	.000	.014	.029	.012	.001	<E. ON HWY. 1A FROM
02:42 PM	1.0	.044	1.8	.000	.007	.018	.005	.000	BENCHLANDS TR.
02:43 PM	0.8	.043	1.8	.000	.004	.013	.006	.000	
02:44 PM	0.7	.043	1.7	.000	.003	.010	.003	.000	
02:45 PM	0.9	.044	1.7	.000	.002	.009	.006	.000	<U-TURN ON HWY.1A
02:46 PM	0.7	.044	1.8	.000	.002	.007	.004	.000	<N. ON 17 ST. FROM HWY. 1A
02:47 PM	0.8	.042	1.8	.000	.002	.024	.019	.001	<W. ON 8 AVE. FROM 17 ST.
02:48 PM	0.7	.042	1.7	.000	.002	.023	.018	.001	<W. ON 7 AVE. FROM 15 ST.
02:49 PM	0.7	.043	1.7	.000	.000	.014	.007	.000	
02:50 PM	0.9	.043	1.9	.000	.010	.015	.002	.001	<W. ON 7 AVE. FROM 10 ST.
02:51 PM	2.1	.040	1.8	.000	.049	.033	-.019	.001	
02:52 PM	0.6	.043	1.8	.000	.024	.019	-.009	.000	<S. ON 2 ST. FROM 7 AVE.
02:53 PM	0.7	.043	1.8	.000	.010	.011	-.003	.000	
02:54 PM	1.1	.044	1.8	.000	.005	.012	-.001	.000	<E. ON 3 AVE FROM 2 ST.
02:55 PM	0.7	.043	1.7	.000	.004	.009	.001	.000	<N ON 4 ST.
02:56 PM	0.6	.045	1.7	.000	.001	.006	.001	.000	
02:57 PM	0.8	.044	1.8	.000	.002	.006	.002	.000	
02:58 PM	1.0	.041	1.7	.000	.009	.013	.000	.000	
02:59 PM	0.7	.044	1.7	.000	.006	.010	.000	.000	<8 AVE. AND 5 ST.
03:00 PM	0.6	.043	1.7	.000	.002	.007	.001	.000	<N. ON RUNDLE DR. FROM 8 AVE.
03:01 PM	1.0	.042	1.7	.000	.003	.009	.001	.000	
03:02 PM	1.6	.047	1.8	.000	.002	.008	.003	.000	<E. ON 3 SISTERS DR.
03:03 PM	1.1	.044	1.7	.000	.003	.008	.003	.000	
03:04 PM	0.9	.041	1.7	.000	.003	.020	.013	.000	<LOOP THRU MCDONALDS PL.
03:05 PM	0.8	.040	1.7	.000	.005	.026	.018	.000	<W. ON THREE SISTERS RD.

One-Minute Average Pollutant Concentrations from Mobile Monitoring Survey of the Bow Corridor: March 2, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
03:06 PM	0.6	.043	1.7	.000	.004	.015	.008	.000	
03:07 PM	1.2	.042	1.7	.000	.010	.018	.005	.000	<E. ON 8 AVE.
03:08 PM	1.4	.040	1.7	.000	.013	.022	.006	.000	
03:09 PM	2.7	.041	1.8	.000	.006	.020	.000	.000	
03:10 PM	2.9	.040	1.9	.000	.001	.015	.000	.000	
03:11 PM	2.8	.031	1.8	.000	.019	.044	.016	.001	
03:12 PM	no data	no data	no data	no data	no data	no data	no data	no data	
03:13 PM	no data	no data	no data	no data	no data	no data	no data	no data	
03:14 PM	no data	no data	no data	no data	no data	no data	no data	no data	
03:15 PM	no data	no data	no data	no data	no data	no data	no data	no data	
04:45 PM	no data	no data	no data	no data	no data	no data	no data	no data	
04:46 PM	no data	no data	no data	no data	no data	no data	no data	no data	
04:47 PM	3.6	.024	1.9	.001	.026	.049	.028	.001	**Canmore monitoring Downtown to Hwy.#1A 4:46 to 5:11 PM.**
04:48 PM	2.5	.028	2.0	.001	.034	.050	.012	.001	
04:49 PM	3.1	.027	1.8	.000	.039	.069	.031	.001	
04:50 PM	0.7	.037	1.7	.000	.023	.040	.021	.000	
04:51 PM	0.7	.038	1.7	.000	.012	.023	.007	.000	<E. ON RAILWAY AVE.
04:52 PM	0.6	.036	1.7	.000	.006	.016	.006	.000	<RAILWAY AVE. AND 17 ST.
04:53 PM	1.6	.035	1.8	.000	.017	.028	.005	.001	<STOPPED ON HWY #1A
04:54 PM	1.8	.037	1.7	.000	.013	.029	.011	.000	
04:55 PM	1.8	.039	1.8	.000	.008	.011	.016	.000	
04:56 PM	2.0	.039	2.5	.000	.005	.013	.006	.000	
04:57 PM	no data	no data	no data	no data	no data	no data	no data	no data	
04:58 PM	no data	no data	no data	no data	no data	no data	no data	no data	
04:59 PM	1.7	.036	1.7	.000	.001	.015	.009	.000	
05:00 PM	1.7	.032	2.0	.000	.009	.021	.009	.000	
05:01 PM	no data	no data	no data	no data	no data	no data	no data	no data	
05:02 PM	no data	no data	no data	no data	no data	no data	no data	no data	
05:03 PM	2.0	.031	1.8	.000	.014	.029	.012	.000	
05:04 PM	2.3	.032	1.8	.000	.016	.038	.026	.000	
05:05 PM	2.7	.034	2.0	.000	.019	.044	.022	.000	
05:06 PM	no data	no data	no data	no data	no data	no data	no data	no data	
05:07 PM	1.5	.027	1.7	.000	.040	.047	.006	.000	
05:08 PM	1.2	.031	1.9	.000	.026	.036	.006	.000	
05:09 PM	1.6	.031	1.8	.000	.013	.027	.003	.001	
05:10 PM	2.7	.032	1.9	.000	.008	.021	.015	.001	
05:11 PM	2.0	.034	1.8	.000	.010	.026	.020	.000	**Monitoring on Hwy #1 West from Canmore to Banff 5:11 to 5:33 PM.**
05:12 PM	1.8	.033	2.2	.000	.007	.031	.021	.000	<DEPART FOR BANFF
05:13 PM	4.4	.028	1.8	.000	.016	.029	.010	.001	LIGHT INTERMITTANT RAIN.

One-Minute Average Pollutant Concentrations from Mobile Monitoring Survey of the Bow Corridor: March 2, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
05:14 PM	1.4	.028	1.8	.000	.024	.029	.004	.000	
05:15 PM	0.9	.030	1.7	.000	.015	.029	.016	.000	
05:16 PM	0.8	.032	1.7	.000	.014	.025	.011	.000	
05:17 PM	0.9	.025	1.7	.000	.013	.027	.000	.000	<W. ON HWY.1
05:18 PM	1.2	.023	1.6	.001	.027	.056	.000	.001	
05:19 PM	0.8	.021	1.6	.001	.059	.096	.005	.001	
05:20 PM	0.7	.026	1.6	.000	.033	.067	.008	.000	
05:21 PM	1.8	.034	1.6	.000	.015	.036	.000	.000	
05:22 PM	0.7	.034	1.6	.001	.034	.036	.000	.001	
05:23 PM	0.6	.038	1.6	.000	.009	.018	.000	.000	
05:24 PM	0.5	.039	1.5	.000	.000	.014	.000	.000	
05:25 PM	0.5	.034	1.6	.000	.006	.015	.004	.000	
05:26 PM	0.8	.021	1.6	.001	.018	.040	.019	.001	NOTE: CO,NO,NOX READINGS FROM HWY #1
05:27 PM	1.2	.013	1.6	.000	.033	.065	.029	.001	
05:28 PM	2.0	.011	1.6	.002	.067	.100	.032	.001	
05:29 PM	1.3	.012	1.6	.001	.078	.119	.036	.001	
05:30 PM	1.0	.015	1.6	.001	.068	.096	.028	.001	
05:31 PM	0.7	.026	1.5	.000	.045	.067	.023	.000	
05:32 PM	0.6	.036	1.5	.000	.024	.036	.012	.000	
05:33 PM	0.8	.033	1.6	.000	.013	.026	.013	.001	**Banff monitoring 5:33 to 5:54 PM.**
05:34 PM	1.2	.026	1.6	.000	.023	.035	.010	.000	
05:35 PM	1.5	.021	1.6	.000	.053	.064	.008	.001	<ENTER BANFF VIA BANFF AVE.
05:36 PM	1.1	.027	1.6	.000	.040	.072	.031	.001	
05:37 PM	1.6	.027	1.7	.000	.028	.062	.024	.000	
05:38 PM	2.3	.022	1.9	.000	.042	.060	.017	.001	<E.ON BANFF AVE. FROM ELK ST.
05:39 PM	3.7	.026	1.9	.002	.056	.075	.017	.001	<E.ON BANFF AVE. FROM CARRIBOU ST.
05:40 PM	2.3	.032	1.7	.000	.051	.058	.007	.001	<E.ON BANFF AVE. FROM BUFFALO ST.
05:41 PM	0.8	.036	1.6	.000	.028	.035	.006	.000	<U-TURN AT INDIAN TRADING POST
05:42 PM	0.8	.035	1.6	.000	.023	.041	.013	.000	
05:43 PM	1.8	.033	1.6	.000	.033	.046	.010	.000	<W.ON BUFFALO ST. AND BEAR AVE.
05:44 PM	2.1	.040	2.6	.000	.029	.045	.012	.001	<STOP AT WOLF ST. AND
05:45 PM	2.4	.036	2.0	.000	.023	.097	.077	.001	LYNX AVE.FOR MAP
05:46 PM	3.0	.037	2.6	.000	.015	.063	.046	.000	
05:47 PM	11.5	.032	2.0	.000	.022	.056	.033	.001	
05:48 PM	1.7	.031	1.8	.000	.022	.059	.036	.000	<N. ON SQUIRREL ST. AND WOLF ST.
05:49 PM	1.1	.029	1.7	.000	.024	.068	.042	.000	<SQUIRREL ST. AND ELK
05:50 PM	0.8	.031	1.6	.000	.022	.050	.024	.000	<SQUIRREL ST. AND MOOSE
05:51 PM	0.6	.033	1.5	.000	.012	.030	.016	.000	
05:52 PM	1.2	.033	1.7	.000	.008	.019	.007	.000	<N. ON COUGAR FROM FOX

One-Minute Average Pollutant Concentrations from Mobile Monitoring Survey of the Bow Corridor: March 2, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
05:53 PM	1.8	.031	1.6	.000	.006	.020	.016	.000	
05:54 PM	2.2	.028	1.9	.000	.007	.030	.024	.000	<E.ON MARMOT FROM COUGAR
05:55 PM	1.5	.026	1.6	.001	.016	.055	.031	.000	<DEPART BANFF
05:56 PM	0.6	.027	1.6	.000	.016	.042	.024	.000	**Monitoring on Hwy #1 from Banff to Canmore 5:54 to 6:11 PM.**
05:57 PM	0.7	.024	1.6	.000	.021	.043	.015	.001	
05:58 PM	0.7	.030	1.5	.000	.024	.045	.020	.000	
05:59 PM	1.0	.028	1.6	.000	.024	.049	.024	.000	17 KM. TO CANMORE
06:00 PM	0.9	.030	1.6	.000	.024	.046	.022	.000	<LOTS OF TRAFFIC ON HWY #1
06:01 PM	1.1	.019	1.6	.000	.045	.070	.026	.001	
06:02 PM	1.1	.009	1.6	.001	.070	.105	.035	.001	
06:03 PM	0.7	.018	1.6	.000	.056	.089	.023	.001	
06:04 PM	0.8	.026	1.5	.000	.044	.064	.017	.000	
06:05 PM	0.7	.021	1.5	.000	.033	.057	.009	.000	
06:06 PM	0.5	.032	1.5	.000	.022	.049	.022	.000	
06:07 PM	0.9	.036	1.5	.000	.030	.036	.012	.001	
06:08 PM	0.9	.037	1.6	.000	.037	.037	.000	.001	
06:09 PM	1.1	.028	1.5	.000	.046	.054	.013	.000	
06:10 PM	1.0	.032	1.5	.001	.037	.056	.015	.001	
06:11 PM	0.6	.035	1.6	.000	.029	.042	.012	.000	**Canmore Monitoring on Hwy #1A to Exshaw 6:11 to 6:35 PM.**
06:12 PM	0.9	.031	1.5	.000	.023	.027	.005	.000	AT W. END OF CANMORE
06:13 PM	1.0	.032	1.6	.000	.013	.021	.007	.000	
06:14 PM	0.7	.036	1.5	.000	.008	.020	.009	.000	
06:15 PM	0.8	.034	1.6	.000	.006	.017	.006	.000	
06:16 PM	0.8	.034	1.5	.000	.005	.018	.009	.000	
06:17 PM	0.9	.036	1.5	.000	.002	.015	.019	.000	<CONT. N. ON HWY 1A TO EXSHAW
06:18 PM	0.5	.036	1.5	.000	.004	.014	.011	.000	
06:19 PM	0.5	.040	1.5	.000	.001	.010	.003	.001	
06:20 PM	0.5	.039	1.5	.000	.003	.005	.006	.000	
06:21 PM	0.6	.039	1.5	.000	.004	.007	.000	.000	<PASS OLD CAMP AND BURNCO
06:22 PM	0.6	.039	1.5	.000	.005	.006	.002	.000	PL. ENTRANCE
06:23 PM	0.5	.040	1.5	.000	.004	.005	.011	.000	
06:24 PM	0.7	.039	1.5	.000	.003	.006	.003	.000	
06:25 PM	0.7	.038	1.5	.000	.003	.006	.000	.000	<PASS GAP LAKE RD.
06:26 PM	1.2	.038	1.3	.000	.007	.009	.002	.000	
06:27 PM	0.8	.037	1.1	.000	.006	.012	.005	.000	
06:28 PM	0.8	.035	1.7	.000	.005	.010	.005	.000	<PASS BAY MAG PLANT ENTRANCE

One-Minute Average Pollutant Concentrations from Mobile Monitoring Survey of the Bow Corridor: March 2, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
06:29 PM	no data	no data	no data	no data	no data	no data	no data	no data	
06:30 PM	no data	no data	no data	no data	no data	no data	no data	no data	
06:31 PM	no data	no data	no data	no data	no data	no data	no data	no data	
06:32 PM	0.9	.035	1.6	.000	.007	.016	.007	.000	
06:33 PM	0.7	.037	1.6	.000	.005	.012	.002	.000	
06:34 PM	0.6	.038	1.6	.000	.002	.009	.005	.000	
06:35 PM	0.6	.036	1.7	.000	.002	.007	.003	.000	<PASS BAYMAG PLANT #1
06:36 PM	0.6	.032	1.6	.000	.003	.011	.010	.000	**Monitoring town of Exshaw on Hwy #1A in and near Exshaw 6:35 to 6:46 PM.**
06:37 PM	0.8	.028	1.7	.001	.005	.015	.006	.001	AT SCHOOL.
06:38 PM	no data	no data	no data	no data	no data	no data	no data	no data	
06:39 PM	no data	no data	no data	no data	no data	no data	no data	no data	
06:40 PM	no data	no data	no data	no data	no data	no data	no data	no data	
06:41 PM	no data	no data	no data	no data	no data	no data	no data	no data	
06:42 PM	0.7	.033	1.7	.000	.008	.021	.015	.000	
06:43 PM	0.7	.020	1.6	.000	.006	.021	.007	.000	
06:44 PM	0.6	.029	1.7	.000	.004	.017	.013	.000	<STOP AT CONTINENTAL WIND=E AT 10 KPH.
06:45 PM	0.8	.021	1.7	.000	.003	.021	.018	.000	<U-TURN AND W. ON HWY.1A
06:46 PM	0.6	.025	1.6	.000	.002	.019	.018	.000	**Monitoring on Hwy #1 Exshaw to Canmore 6:46 to 7:03 PM.**
06:47 PM	0.5	.035	1.7	.000	.002	.017	.013	.000	<PASS BAYMAG PLANT #1 ENTRANCE
06:48 PM	0.5	.036	1.6	.000	.002	.012	.012	.000	
06:49 PM	0.5	.038	1.6	.000	.002	.009	.006	.000	
06:50 PM	0.6	.034	1.6	.000	.006	.010	.005	.000	<PASS BAYMAG PLANT #2 ENTRANCE
06:51 PM	0.6	.034	1.6	.000	.003	.012	.008	.000	
06:52 PM	0.6	.039	1.6	.000	.004	.007	.002	.000	
06:53 PM	0.3	.039	1.6	.000	.002	.006	.003	.000	<PASS GAP LAKE RD. ENTRANCE
06:54 PM	0.5	.039	1.6	.000	.002	.006	.007	.000	SOME ODOR DETECTED APPROXIMATELY
06:55 PM	0.5	.035	1.6	.000	.007	.012	.007	.000	5 KM W. OF GAP LAKE. WE ARE DIRECTLY
06:56 PM	0.6	.033	1.6	.000	.011	.023	.010	.001	W. OF AND AT THE SAME ALTITUDE AS THE
06:57 PM	0.6	.034	1.6	.000	.008	.020	.008	.000	PLANT STACKS.
06:58 PM	0.5	.035	1.6	.000	.006	.009	.005	.000	
06:59 PM	0.6	.037	1.6	.000	.003	.006	.006	.000	
07:00 PM	0.5	.035	1.6	.000	.003	.011	.010	.000	
07:01 PM	0.5	.035	1.6	.000	.002	.012	.011	.000	
07:02 PM	0.6	.033	1.6	.000	.002	.011	.007	.001	
07:03 PM	0.6	.035	1.6	.000	.000	.012	.002	.000	

One-Minute Average Pollutant Concentrations from Mobile Monitoring Survey of the Bow Corridor: March 2, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
07:04 PM	3.0	.035	1.9	.000	.005	.008	.000	.000	
07:05 PM	1.1	.038	1.6	.000	.005	.009	.003	.000	
07:06 PM	0.6	.039	1.6	.000	.003	.008	.006	.000	
07:07 PM	1.1	.036	1.7	.000	.004	.018	.018	.000	<STOP AT TURBO FOR GAS
07:08 PM	1.1	.032	1.7	.000	.006	.018	.010	.000	
07:09 PM	1.0	.031	1.7	.000	.006	.019	.010	.000	
07:10 PM	1.2	.034	1.7	.000	.006	.020	.015	.000	
07:11 PM	1.2	.035	2.3	.000	.006	.017	.011	.000	
07:12 PM	1.1	.034	1.7	.000	.006	.014	.006	.001	
07:13 PM	0.8	.039	1.7	.000	.005	.012	.000	.000	
07:14 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:15 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:45 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:46 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:47 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:48 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:49 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:50 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:51 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:52 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:53 PM	no data	no data	no data	no data	no data	no data	no data	no data	
07:54 PM	3.9	.030	1.8	.001	.022	.040	.020	0.0	**Monitoring in Canmore 7:53 to 8:05 PM.**
07:55 PM	0.7	.034	1.7	.000	.014	.022	.001	0.0	<E. ON 17 ST. FROM 8 AVE.
07:56 PM	0.7	.034	1.7	.000	.007	.015	.007	0.0	
07:57 PM	0.6	.034	1.7	.000	.004	.012	.007	0.0	<W.ON FAIRHOLM DR. FROM 17 ST.
07:58 PM	0.7	.034	1.7	.000	.003	.010	.006	0.0	
07:59 PM	0.6	.033	1.7	.000	.002	.010	.006	0.0	<8 ST. AND FAIRHOLM DR.
08:00 PM	0.6	.035	1.7	.000	.003	.009	.004	0.0	
08:01 PM	1.0	.035	1.7	.000	.001	.010	.005	0.0	<U-TURN AT RUNDLE CRES. AND RUNDLE DR.
08:02 PM	0.7	.036	1.6	.000	.003	.007	.009	0.0	
08:03 PM	0.7	.034	1.7	.000	.004	.013	.004	0.0	
08:04 PM	0.7	.034	1.7	.000	.004	.014	.004	0.0	
08:05 PM	0.7	.033	1.7	.000	.004	.026	.021	0.0	<RAILWAY AVE. AND HWY. 1A
08:06 PM	0.7	.033	1.7	.000	.006	.028	.018	0.0	**Monitoring on Hwy #1 East toward Calgary 8:05 to 8:25 PM.**
08:07 PM	0.5	.036	1.6	.000	.002	.012	.016	.000	HEAD BACK TO CALGARY

One-Minute Average Pollutant Concentrations from Mobile Monitoring Survey of the Bow Corridor: March 2, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
08:08 PM	0.5	.036	1.6	.000	.000	.010	.004	.000	
08:09 PM	0.5	.035	1.5	.000	.001	.008	.002	.000	
08:10 PM	0.5	.034	1.6	.000	.007	.011	.002	.000	
08:11 PM	0.5	.034	1.7	.000	.017	.025	.008	.000	
08:12 PM	0.5	.032	1.6	.000	.011	.022	.011	.000	PASS DEAD MANS FLATS EXIT
08:13 PM	0.4	.031	1.6	.000	.010	.021	.011	.000	
08:14 PM	0.5	.036	1.6	.000	.010	.017	.003	.000	
08:15 PM	0.7	.036	1.6	.001	.011	.030	.015	.000	
08:16 PM	0.5	.034	1.6	.000	.013	.029	.019	.000	
08:17 PM	0.4	.037	1.6	.000	.012	.018	.004	.000	
08:18 PM	0.4	.033	1.6	.000	.012	.016	.006	.000	<PASS LAC DES ARCS
08:19 PM	0.6	.026	1.6	.000	.009	.021	.012	.000	
08:20 PM	0.5	.025	1.6	.000	.012	.024	.007	.001	
08:21 PM	0.4	.026	1.6	.000	.011	.025	.000	.000	
08:22 PM	0.5	.028	1.6	.000	.008	.025	.008	.000	
08:23 PM	0.6	.033	1.6	.000	.009	.023	.004	.000	
08:24 PM	0.5	.031	1.6	.000	.017	.026	.012	.000	<PASS EXSHAW EXIT SIGN ON HWY.1
08:25 PM	0.7	.032	1.6	.000	.021	.034	.015	.000	
08:26 PM	0.5	.036	1.6	.000	.010	.024	.010	.001	<END AT KANANASKIS EXIT SIGN

One-Minute Average Pollutant Concentrations from Mobile Monitoring of the Bow Corridor: March 12, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
10:45 AM	0.2	0.045	1.82	0.000	0.056	0.066	0.006	0.001	**Highway monitoring from Calgary to Exshaw,**
10:46 AM	0.2	0.046	1.78	0.000	0.039	0.045	0.003	0.001	**10:45 hrs to 11:43 AM.**
10:48 AM	0.2	0.047	1.84	0.000	0.025	0.029	0.000	0.001	Leaving city limits, heading W.
10:49 AM	0.2	0.047	1.70	0.000	0.024	0.026	0.000	0.001	TransCanada Highway
10:50 AM	0.2	0.047	1.80	0.000	0.022	0.026	0.001	0.001	
10:51 AM	0.2	0.046	1.82	0.000	0.026	0.031	0.001	0.001	
10:52 AM	0.3	0.045	1.82	0.000	0.027	0.033	0.001	0.001	
10:53 AM	0.2	0.045	1.84	0.000	0.032	0.041	0.003	0.002	
10:54 AM	1.3	0.042	1.84	0.001	0.048	0.052	0.000	0.002	
10:55 AM	2.0	0.039	1.74	0.002	0.061	0.072	0.007	0.002	
10:56 AM	0.7	0.044	1.78	0.000	0.052	0.072	0.016	0.001	
10:57 AM	0.3	0.045	1.76	0.000	0.037	0.052	0.008	0.001	
10:58 AM	0.3	0.041	1.74	0.001	0.049	0.058	0.002	0.001	
10:59 AM	1.1	0.036	1.74	0.001	0.072	0.093	0.013	0.002	
11:00 AM	1.0	0.039	1.74	0.000	0.078	0.091	0.008	0.001	TransCanada & Jumping Pound Crk.
11:01 AM	1.0	0.047	1.72	0.001	0.055	0.064	0.004	0.001	
11:02 AM	0.8	0.046	1.68	0.000	0.040	0.051	0.006	0.001	
11:03 AM	1.2	0.045	1.64	0.000	0.034	0.049	0.009	0.001	
11:04 AM	0.4	0.048	1.68	0.000	0.027	0.039	0.005	0.000	
11:05 AM	0.2	0.048	1.66	0.000	0.029	0.047	0.013	0.001	
11:06 AM	0.2	0.049	1.68	0.000	0.032	0.052	0.014	0.001	
11:07 AM	0.1	0.049	1.66	0.000	0.022	0.034	0.007	0.001	
11:08 AM	0.4	0.049	1.68	0.000	0.023	0.031	0.002	0.001	
11:09 AM	0.1	0.050	1.68	0.000	0.020	0.028	0.003	0.001	TransCanada & Sibald Creek Tr.
11:10 AM	0.8	0.049	1.64	0.000	0.021	0.029	0.002	0.001	
11:11 AM	1.0	0.048	1.60	0.001	0.024	0.038	0.010	0.001	
11:12 AM	0.1	0.048	1.64	0.000	0.024	0.037	0.007	0.001	
11:13 AM	0.0	0.050	1.68	0.000	0.021	0.031	0.004	0.001	
11:14 AM	0.1	0.048	1.82	0.000	0.022	0.029	0.003	0.001	TransCanada & Bear Hill Rd.
11:15 AM	0.3	0.047	1.82	0.000	0.025	0.040	0.008	0.001	
11:16 AM	0.6	0.047	1.74	0.000	0.023	0.038	0.008	0.001	
11:17 AM	0.4	0.048	1.74	0.000	0.029	0.036	0.004	0.001	
11:18 AM	0.3	0.049	1.74	0.000	0.028	0.038	0.005	0.001	TransCanada & Morley Rd.
11:19 AM	0.2	0.047	1.74	0.000	0.027	0.035	0.003	0.001	
11:20 AM	0.6	0.046	1.72	0.000	0.028	0.035	0.004	0.001	
11:21 AM	0.4	0.047	1.78	0.000	0.025	0.037	0.006	0.001	
11:22 AM	0.1	0.049	1.76	0.000	0.022	0.034	0.006	0.001	
11:23 AM	0.0	0.047	1.72	0.000	0.025	0.031	0.002	0.001	
11:24 AM	0.1	0.046	1.78	0.000	0.026	-0.002	0.000	0.001	
11:25 AM	2.3	0.045	1.82	0.001	0.038	0.044	0.006	0.001	
11:26 AM	0.9	0.041	1.76	0.003	0.072	0.084	0.006	0.002	
11:27 AM	1.3	0.033	1.84	0.003	0.153	0.186	0.028	0.003	Greyhound Bus passing AQML

One-Minute Average Pollutant Concentrations from Mobile Monitoring of the Bow Corridor: March 12, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
11:28 AM	1.1	0.042	1.78	0.001	0.108	0.141	0.026	0.001	TransCanada & Kananaski Tr.
11:29 AM	1.0	0.029	1.74	0.003	0.171	0.178	0.001	0.003	Diesel truck passing AQML
11:30 AM	0.3	0.039	1.74	0.001	0.132	0.144	0.005	0.001	TransCanada & Kananaski River
11:31 AM	0.3	0.048	1.70	0.000	0.073	0.079	0.002	0.001	Exshaw turnoff to 1X Highway
11:32 AM	0.3	0.048	1.72	0.000	0.039	0.045	0.000	0.001	End event #1
11:33 AM	0.3	0.049	1.74	0.000	0.026	0.033	0.000	0.000	Start Event #2
11:34 AM	0.3	0.051	1.74	0.000	0.022	0.023	0.000	0.000	Passing Bow Valley Prov. Park
11:35 AM	0.3	0.050	1.76	0.000	0.021	0.022	0.000	0.000	Highway 1A & Highway 1X, heading W.
11:36 AM	0.3	0.051	1.66	0.000	0.020	0.021	0.000	0.000	
11:37 AM	0.3	0.051	1.77	0.000	0.020	0.021	0.000	0.000	
11:38 AM	0.3	0.050	1.71	0.000	0.020	0.022	0.000	0.000	
11:39 AM	0.3	0.050	1.78	0.000	0.019	0.022	0.000	0.000	
11:40 AM	0.3	0.049	1.83	0.000	0.022	0.023	0.000	0.001	
11:41 AM	0.3	0.050	1.72	0.000	0.023	0.026	0.000	0.000	
11:42 AM	0.0	0.050	1.75	0.000	0.021	0.024	0.000	0.000	
11:43 AM	0.1	0.040	1.87	0.001	0.028	0.034	0.002	0.001	**Exshaw residential monitoring, 11:43 AM to 12:18 PM.**
11:44 AM	0.1	0.017	1.86	0.005	0.062	0.087	0.020	0.001	1/2 km from Exshaw
11:45 AM	0.0	0.025	1.80	0.003	0.062	0.104	0.037	0.001	Slowing down, odors detected
11:46 AM	0.1	0.042	1.85	0.001	0.044	0.071	0.023	0.000	Turning into 1st access road to Exshaw
11:47 AM	0.2	0.046	1.82	0.000	0.031	0.050	0.014	0.001	Heart Mtn Dr. & Barrier Dr. heading N.
11:48 AM	0.4	0.026	1.90	0.005	0.063	0.077	0.009	0.001	Kiln #5 operating; odors detected, stop briefly at Barrier Mtn I
11:49 AM	2.1	0.009	2.10	0.013	0.230	0.255	0.019	0.004	
11:50 AM	2.5	0.012	2.17	0.011	0.275	0.324	0.044	0.004	
11:51 AM	2.2	0.032	1.96	0.004	0.198	0.252	0.049	0.002	Barrier Mtn Rd., turning around
11:52 AM	1.1	0.026	1.87	0.006	0.171	0.186	0.012	0.002	odors detected, stopping briefly; facing south
11:53 AM	0.0	0.009	1.94	0.009	0.207	0.240	0.029	0.003	Heart Mtn Dr. heading W.
11:54 AM	0.1	0.020	1.90	0.005	0.170	0.212	0.038	0.002	Wind Ridge Dr., turning N.
11:55 AM	0.1	0.045	1.77	0.001	0.090	0.116	0.021	0.001	
11:56 AM	0.8	0.045	2.54	0.002	0.057	0.089	0.029	0.001	
11:57 AM	3.3	0.040	2.06	0.003	0.057	0.219	0.159	0.002	Stopping at #28 Wind Ridge Dr.
11:58 AM	0.6	0.019	1.74	0.018	0.178	0.332	0.148	0.003	Strong odors from kiln #4
11:59 AM	0.1	0.018	1.73	0.015	0.223	0.319	0.091	0.003	
12:00 PM	0.2	0.010	1.76	0.044	0.281	0.342	0.056	0.007	
12:01 PM	1.2	0.018	1.97	0.073	0.183	0.241	0.054	0.027	#30 Wind Ridge Dr, strong SO2 odor
12:02 PM	1.2	0.036	2.04	0.021	0.104	0.146	0.036	0.009	Dense plume of smoke from kiln #4
12:03 PM	0.7	0.043	2.01	0.004	0.066	0.090	0.020	0.001	smoke duration 2 minutes
12:04 PM	0.7	0.039	1.80	0.003	0.051	0.073	0.018	0.000	
12:05 PM	0.2	0.037	1.66	0.003	0.042	0.065	0.020	0.001	
12:06 PM	0.2	0.038	1.67	0.002	0.038	0.059	0.018	0.001	
12:07 PM	0.2	0.041	1.67	0.001	0.033	0.052	0.014	0.000	Mtn Kidd Cr, turning around
12:08 PM	0.1	0.049	1.78	0.000	0.029	0.041	0.007	0.000	3 minute smoke plume from kiln #4
12:09 PM	0.2	0.049	1.89	0.000	0.033	0.036	0.000	0.000	
12:10 PM	0.1	0.047	2.44	0.000	0.031	0.036	0.000	0.000	Highway 1A, heading W.
12:11 PM	0.2	0.045	1.74	0.000	0.030	0.038	0.003	0.000	Allan Dr., turning N.

One-Minute Average Pollutant Concentrations from Mobile Monitoring of the Bow Corridor: March 12, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
12:12 PM	0.4	0.048	1.85	0.000	0.032	0.039	0.002	0.000	
12:13 PM	1.9	0.043	2.01	0.001	0.056	0.084	0.023	0.001	
12:14 PM	1.5	0.045	1.88	0.000	0.055	0.084	0.022	0.001	
12:15 PM	0.3	0.047	2.16	0.000	0.046	0.058	0.007	0.001	Mt Sparrowhawk Rd, stopping briefly
12:16 PM	0.1	0.041	2.02	0.001	0.041	0.053	0.008	0.000	Turned around, heading for Highway
12:17 PM	2.2	0.039	2.73	0.002	0.094	0.089	0.000	0.001	
12:18 PM	1.5	0.042	1.86	0.001	0.106	0.105	0.000	0.000	**Highway 1A, Mt Sparrowhawk Rd to Baymag Plant**
12:19 PM	0.2	0.046	1.70	0.000	0.066	0.068	0.000	0.000	**entrance, 1218 to 1228 PM.**
12:20 PM	0.1	0.047	1.67	0.000	0.046	0.050	0.000	0.000	Hwy. 1A heading W.; Passing Baymag Plant #1 entrance
12:21 PM	0.0	0.049	1.75	0.000	0.044	0.042	0.000	0.000	Highway 1A, turned around, heading E.
12:22 PM	0.0	0.049	1.75	0.000	0.040	0.041	0.000	0.000	
12:23 PM	0.2	0.048	1.88	0.000	0.037	0.042	0.000	0.000	Back to Baymag Plant
12:24 PM	1.2	0.046	1.85	0.000	0.044	0.064	0.016	0.001	Stopped to talk to striking employees
12:25 PM	0.2	0.047	1.76	0.000	0.040	0.058	0.013	0.000	
12:26 PM	0.1	0.048	1.79	0.000	0.035	0.047	0.006	0.000	
12:27 PM	0.3	0.047	1.83	0.000	0.034	0.046	0.008	0.000	Left striking employees, heading E.
12:28 PM	0.6	0.046	1.77	0.000	0.039	0.060	0.017	0.000	**Exshaw residential monitoring, 1228 to 1253 PM.**
12:29 PM	0.2	0.047	1.90	0.000	0.038	0.059	0.016	0.000	Wind Ridge Rd., heading N. slowly
12:30 PM	0.7	0.025	2.18	0.006	0.099	0.112	0.009	0.001	visible emissions from stack N. of
12:31 PM	1.1	0.014	1.76	0.006	0.152	0.216	0.060	0.002	red colored stack
12:32 PM	0.1	0.041	1.69	0.001	0.105	0.147	0.037	0.000	
12:33 PM	0.1	0.050	1.61	0.000	0.065	0.084	0.014	0.000	Mt Kidd Cr, heading S.
12:34 PM	0.0	0.051	1.72	0.000	0.049	0.058	0.005	0.000	#53 Mt Kidd Cr, directly under plume
12:35 PM	0.7	0.042	2.09	0.005	0.081	0.084	0.000	0.001	from kiln #4; detecting NOx odor
12:36 PM	3.5	0.009	2.59	0.031	0.409	0.462	0.046	0.007	
12:37 PM	1.2	0.005	2.09	0.028	0.461	0.525	0.057	0.004	
12:38 PM	1.3	0.014	1.99	0.014	0.314	0.374	0.055	0.002	
12:39 PM	1.1	0.009	2.19	0.027	0.326	0.367	0.036	0.004	
12:40 PM	1.5	0.009	2.37	0.022	0.348	0.377	0.024	0.004	
12:41 PM	1.5	0.023	1.96	0.010	0.322	0.312	0.000	0.002	
12:42 PM	0.4	0.046	1.94	0.001	0.178	0.172	0.000	0.000	
12:43 PM	0.4	0.048	1.89	0.000	0.107	0.103	0.000	0.000	
12:44 PM	0.2	0.044	1.94	0.001	0.082	0.082	0.000	0.000	
12:45 PM	0.8	0.037	2.00	0.002	0.085	0.119	0.029	0.000	
12:46 PM	2.5	0.044	2.35	0.001	0.091	0.115	0.021	0.001	
12:47 PM	1.0	0.043	1.99	0.000	0.080	0.115	0.029	0.000	
12:48 PM	0.2	0.047	1.90	0.000	0.066	0.085	0.014	0.000	On Highway 1A
12:49 PM	0.3	0.048	1.73	0.000	0.061	0.071	0.006	0.000	Barrier Mtn Dr, heading N.
12:50 PM	0.4	0.048	1.65	0.000	0.060	0.068	0.003	0.000	
12:51 PM	0.3	0.042	1.89	0.000	0.060	0.070	0.006	0.000	Barrier Mtn Dr, heading S.
12:52 PM	0.9	0.042	1.98	0.000	0.062	0.076	0.009	0.001	
12:53 PM	0.2	0.047	1.84	0.000	0.061	0.072	0.006	0.001	**Highway 1A, heading east to Highway 1X,**
12:54 PM	0.6	0.046	1.78	0.000	0.062	0.079	0.013	0.001	**12:53 to 1:03 PM.**

One-Minute Average Pollutant Concentrations from Mobile Monitoring of the Bow Corridor: March 12, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
12:55 PM	1.0	0.043	1.87	0.000	0.068	0.106	0.033	0.001	Highway 1A, heading E.
12:56 PM	1.1	0.036	2.01	0.001	0.082	0.126	0.040	0.001	Passing Continental Lime entrance
12:57 PM	2.6	0.034	2.02	0.002	0.102	0.146	0.040	0.001	
12:58 PM	1.7	0.046	1.97	0.001	0.093	0.121	0.024	0.001	
12:59 PM	1.3	0.048	1.83	0.001	0.099	0.096	0.000	0.001	
01:00 PM	0.5	0.048	1.76	0.000	0.088	0.079	0.000	0.001	Passing Old Bow Tr parking area
01:01 PM	0.2	0.051	1.81	0.000	0.073	0.079	0.003	0.001	
01:02 PM	0.2	0.050	1.80	0.000	0.069	0.072	0.000	0.000	
01:03 PM	0.1	0.050	1.78	0.000	0.064	0.067	0.000	0.000	**Highway 1X to Highway 1, includes Bow Valley**
01:04 PM	0.1	0.051	1.78	0.000	0.061	0.065	0.000	0.000	**Prov. Park, 1:03 to 1:23 PM.**
01:05 PM	0.1	0.051	1.77	0.000	0.060	0.064	0.001	0.001	Highway 1A & Highway Ix, heading S.
01:06 PM	0.1	0.051	1.67	0.000	0.060	0.062	0.000	0.000	Turning into Bow Valley Prov. Park
01:07 PM	0.0	0.047	1.72	0.000	0.059	0.063	0.001	0.001	
01:08 PM	0.1	0.046	1.67	0.000	0.058	0.064	0.002	0.000	
01:09 PM	0.1	0.050	1.63	0.000	0.055	0.059	0.001	0.000	
01:10 PM	0.1	0.050	1.74	0.000	0.052	0.057	0.001	0.000	
01:11 PM	0.0	0.044	1.70	0.000	0.050	0.058	0.004	0.000	
01:12 PM	0.0	0.039	1.81	0.000	0.051	0.061	0.007	0.001	
01:13 PM	0.1	0.034	1.80	0.001	0.054	0.068	0.011	0.001	Stopping just passed Middle Lake
01:14 PM	2.3	0.031	2.28	0.002	0.127	0.084	0.000	0.001	turning around
01:15 PM	1.2	0.027	1.85	0.002	0.141	0.117	0.000	0.001	
01:16 PM	0.5	0.027	1.82	0.001	0.109	0.106	0.000	0.001	
01:17 PM	0.9	0.031	1.81	0.001	0.091	0.090	0.000	0.001	
01:18 PM	1.3	0.035	1.82	0.000	0.074	0.083	0.005	0.001	
01:19 PM	0.1	0.039	1.73	0.000	0.060	0.072	0.008	0.001	
01:20 PM	0.1	0.048	1.77	0.000	0.051	0.058	0.004	0.001	
01:21 PM	0.1	0.051	1.69	0.000	0.045	0.051	0.002	0.000	
01:22 PM	0.1	0.046	1.72	0.000	0.044	0.050	0.002	0.000	Left Bow Valley Prov. Park
01:23 PM	0.1	0.044	1.71	0.000	0.045	0.053	0.004	0.000	**Highway #1 to Canmore, 1:23 to 1:47 PM.**
01:24 PM	0.7	0.045	1.67	0.001	0.050	0.060	0.008	0.000	TransCanada Highway, heading W.
01:25 PM	0.9	0.043	1.72	0.000	0.061	0.090	0.024	0.001	
01:26 PM	0.8	0.044	1.75	0.000	0.062	0.092	0.028	0.001	TransCanada Highway overlooking valley
01:27 PM	0.3	0.042	1.81	0.001	0.055	0.075	0.018	0.001	acrid odor detected from LaFarge
01:28 PM	0.4	0.043	1.94	0.001	0.048	0.065	0.016	0.001	
01:29 PM	0.1	0.048	1.90	0.000	0.041	0.051	0.006	0.000	
01:30 PM	0.1	0.049	1.74	0.000	0.035	0.042	0.003	0.000	
01:31 PM	0.5	0.047	1.81	0.000	0.037	0.045	0.004	0.000	
01:32 PM	0.5	0.048	1.71	0.000	0.037	0.049	0.009	0.000	Passing Lac Des Arcs turnoff
01:33 PM	0.6	0.049	1.79	0.000	0.036	0.054	0.015	0.000	
01:34 PM	0.0	0.050	1.77	0.000	0.031	0.046	0.012	0.000	
01:35 PM	0.1	0.047	1.80	0.001	0.040	0.054	0.011	0.000	
01:36 PM	0.2	0.043	1.76	0.001	0.051	0.075	0.021	0.001	
01:37 PM	0.3	0.041	1.74	0.001	0.055	0.069	0.012	0.000	

One-Minute Average Pollutant Concentrations from Mobile Monitoring of the Bow Corridor: March 12, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
01:38 PM	0.1	0.049	1.71	0.000	0.040	0.052	0.008	0.000	
01:39 PM	0.2	0.050	1.70	0.000	0.031	0.039	0.003	0.000	Trans-Canada & Deadman Flats
01:40 PM	0.2	0.051	1.77	0.000	0.030	0.036	0.002	0.000	
01:41 PM	0.3	0.049	1.71	0.000	0.034	0.042	0.006	0.000	
01:42 PM	0.4	0.046	1.76	0.000	0.039	0.048	0.006	0.001	
01:43 PM	0.2	0.043	1.74	0.000	0.047	0.055	0.005	0.001	
01:44 PM	0.2	0.047	1.77	0.000	0.047	0.054	0.004	0.000	Highway 1A to Canmore
01:45 PM	0.1	0.048	1.80	0.000	0.042	0.049	0.004	0.000	
01:46 PM	0.1	0.048	1.74	0.000	0.042	0.046	0.000	0.001	
01:47 PM	0.2	0.050	1.77	0.000	0.044	0.045	0.000	0.000	**Canmore survey, 1:47 to 2:03 PM.**
01:48 PM	0.2	0.047	1.86	0.000	0.043	0.048	0.003	0.000	Passing Benchlands Blvd.
01:49 PM	0.4	0.046	1.80	0.000	0.044	0.049	0.003	0.001	
01:50 PM	0.1	0.049	1.83	0.000	0.041	0.052	0.009	0.000	
01:51 PM	0.3	0.047	1.86	0.000	0.045	0.055	0.007	0.000	
01:52 PM	0.1	0.048	1.79	0.000	0.044	0.049	0.004	0.001	
01:53 PM	0.1	0.047	1.70	0.000	0.047	0.057	0.007	0.000	17 Ave & Railway Ave.
01:54 PM	0.2	0.046	1.80	0.000	0.051	0.058	0.004	0.001	Railway Ave, heading SE.
01:55 PM	0.2	0.048	1.68	0.000	0.049	0.053	0.002	0.000	
01:56 PM	0.2	0.049	1.73	0.000	0.051	0.049	0.000	0.000	
01:57 PM	0.5	0.049	1.85	0.000	0.060	0.048	0.000	0.001	8 St., heading W.
01:58 PM	1.0	0.046	2.03	0.000	0.059	0.058	0.000	0.001	Up 7 St. & left on 10 St.
01:59 PM	1.2	0.045	1.81	0.000	0.056	0.072	0.016	0.000	
02:00 PM	0.4	0.046	1.87	0.000	0.058	0.066	0.006	0.000	Turning into liquor store parking lot
02:01 PM	0.5	0.048	1.92	0.000	0.053	0.054	0.000	0.000	
02:02 PM	2.3	0.044	2.00	0.000	0.046	0.047	0.000	0.001	
02:03 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:04 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:05 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:06 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:07 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:08 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:09 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:10 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:11 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:12 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:13 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:14 PM	no data	no data	no data	no data	no data	no data	no data	no data	
02:15 PM	no data	no data	no data	no data	no data	no data	no data	no data	
04:00 PM	no data	no data	no data	no data	no data	no data	no data	no data	
04:01 PM	1.1	0.034	1.89	0.001	0.103	0.121	0.016	0.002	**Banff Survey, 4:00 to 4:30 PM.**
04:02 PM	1.7	0.035	1.85	0.001	0.116	0.127	0.009	0.002	Banff Ave. & Buffalo St., heading SW.
04:03 PM	0.9	0.036	1.75	0.001	0.091	0.146	0.057	0.001	Spray Ave & Cascade Ct.
04:04 PM	0.3	0.045	1.72	0.001	0.042	0.070	0.025	0.000	Banff Springs Hotel, turning around

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TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
04:05 PM	0.3	0.047	1.77	0.000	0.019	0.036	0.015	0.001	
04:06 PM	0.7	0.038	1.81	0.001	0.043	0.053	0.009	0.001	Spray & Rundle, heading N.
04:07 PM	0.5	0.041	1.77	0.000	0.031	0.054	0.021	0.001	Spray, crossing bridge to town center
04:08 PM	0.5	0.046	1.80	0.000	0.017	0.027	0.010	0.001	Banff Ave & Buffalo
04:09 PM	0.8	0.044	1.92	0.001	0.024	0.027	0.003	0.000	Buffalo & Bear, heading N.
04:10 PM	1.4	0.040	1.80	0.000	0.014	0.064	0.049	0.001	Lynx & Caribou, heading N.
04:11 PM	0.3	0.044	1.84	0.000	0.007	0.036	0.028	0.001	Lynx & Wolf, stopped
04:12 PM	0.4	0.043	1.99	0.000	0.005	0.026	0.022	0.001	
04:13 PM	2.1	0.040	1.93	0.001	0.016	0.064	0.047	0.001	
04:14 PM	1.1	0.042	1.88	0.000	0.015	0.049	0.032	0.001	
04:15 PM	0.7	0.043	1.74	0.000	0.012	0.035	0.021	0.001	
04:16 PM	0.6	0.043	1.74	0.000	0.012	0.024	0.012	0.000	Lynx & Gop , Lynx & Elk heading S.
04:17 PM	0.4	0.047	1.68	0.000	0.009	0.013	0.003	0.001	Elk & Bighorn, stopped at light
04:18 PM	0.6	0.044	1.83	0.000	0.016	0.011	0.000	0.000	
04:19 PM	1.0	0.041	1.85	0.000	0.014	0.017	0.004	0.000	Elk & Banff Ave.
04:20 PM	1.1	0.035	2.01	0.001	0.023	0.033	0.010	0.001	Banff Ave & Caribou, stopping at light
04:21 PM	1.2	0.039	1.88	0.001	0.025	0.062	0.035	0.001	Crossing Banff Ave Bridge
04:22 PM	1.7	0.038	2.29	0.001	0.051	0.122	0.069	0.002	Turning around at Trading Post
04:23 PM	2.0	0.038	1.74	0.001	0.088	0.101	0.012	0.002	
04:24 PM	0.8	0.044	1.77	0.000	0.051	0.056	0.004	0.001	Turning right on Beaver
04:25 PM	0.9	0.040	1.85	0.000	0.035	0.040	0.003	0.001	
04:26 PM	0.9	0.042	1.94	0.000	0.019	0.030	0.010	0.001	Beaver & Wolf
04:27 PM	0.7	0.042	1.89	0.000	0.019	0.023	0.004	0.001	Beaver & Moose
04:28 PM	0.9	0.042	1.99	0.000	0.014	0.016	0.001	0.001	Beaver & Banff Ave., heading N.
04:29 PM	2.0	0.036	1.91	0.001	0.035	0.035	0.000	0.001	Banff Ave. & Antelope St.
04:30 PM	2.9	0.028	1.97	0.002	0.051	0.072	0.020	0.002	Banff Ave. & Marmot St., heading N.
04:31 PM	1.1	0.038	1.86	0.000	0.031	0.065	0.034	0.001	**Highway #1, Banff to Canmore, 4:30 to 4:45 PM.**
04:32 PM	0.4	0.041	1.71	0.000	0.023	0.039	0.016	0.001	
04:33 PM	0.3	0.042	1.69	0.000	0.010	0.019	0.008	0.001	Leaving Banff
04:34 PM	0.4	0.043	1.71	0.001	0.001	0.005	0.002	0.001	
04:35 PM	0.8	0.037	1.72	0.003	0.024	0.044	0.017	0.001	
04:36 PM	0.5	0.038	1.73	0.002	0.039	0.070	0.029	0.001	
04:37 PM	0.5	0.039	1.71	0.001	0.045	0.054	0.008	0.001	
04:38 PM	0.7	0.033	1.67	0.001	0.054	0.076	0.021	0.001	
04:39 PM	0.4	0.038	1.68	0.001	0.041	0.072	0.029	0.001	
04:40 PM	0.3	0.035	1.66	0.001	0.036	0.069	0.030	0.001	
04:41 PM	0.3	0.039	1.70	0.000	0.020	0.040	0.019	0.001	
04:42 PM	0.3	0.039	1.68	0.001	0.016	0.031	0.014	0.001	Passing through Banff Park gates
04:43 PM	0.5	0.036	1.66	0.010	0.071	0.121	0.049	0.002	
04:44 PM	0.4	0.040	1.67	0.003	0.057	0.096	0.038	0.001	
04:45 PM	0.5	0.042	1.67	0.000	0.031	0.051	0.018	0.001	**Canmore Survey, 4:45 to 5:02 PM.**
04:46 PM	0.5	0.041	1.66	0.000	0.016	0.027	0.009	0.000	Entering Canmore
04:47 PM	0.3	0.041	1.68	0.000	0.007	0.015	0.007	0.000	17 St, heading W.

One-Minute Average Pollutant Concentrations from Mobile Monitoring of the Bow Corridor: March 12, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
04:48 PM	0.3	0.041	1.65	0.000	0.002	0.010	0.006	0.000	
04:49 PM	0.3	0.041	1.69	0.000	0.003	0.007	0.004	0.001	17 St. onto 8 Ave.; Left onto 15 St.
04:50 PM	0.3	0.040	1.67	0.000	0.002	0.006	0.002	0.001	Right onto 7 Ave.
04:51 PM	0.6	0.040	1.76	0.000	0.008	0.007	0.000	0.001	7 Ave. & 10 St.
04:52 PM	1.8	0.038	1.71	0.000	0.024	0.022	0.000	0.000	7 Ave. & 5 St.
04:53 PM	0.5	0.041	1.65	0.000	0.010	0.019	0.007	0.000	Left onto 2 St
04:54 PM	0.3	0.041	1.68	0.000	0.003	0.011	0.006	0.000	Left onto 6 Ave.; Left onto 3 St.
04:55 PM	0.4	0.040	1.71	0.000	0.003	0.010	0.005	0.001	Right onto 7 Ave.
04:56 PM	1.1	0.037	1.96	0.001	0.016	0.037	0.020	0.001	Right onto 8 St.; Stop at 8 St. and 6 Ave.
04:57 PM	2.2	0.036	2.01	0.000	0.018	0.051	0.032	0.001	
04:58 PM	0.8	0.036	1.70	0.001	0.028	0.039	0.007	0.001	Turning right on Railway
04:59 PM	1.1	0.034	1.70	0.001	0.065	0.074	0.008	0.002	Turning onto Highway 1A
05:00 PM	0.5	0.034	1.70	0.000	0.063	0.092	0.027	0.001	
05:01 PM	0.4	0.040	1.70	0.000	0.031	0.049	0.017	0.001	Passing Elk Run Industrial Park
05:02 PM	0.3	0.042	1.70	0.000	0.013	0.023	0.009	0.001	**Highway #1A to Exshaw, 5:02 to 5:14 PM.**
05:03 PM	0.3	0.043	0.29	0.000	0.004	0.011	0.005	0.000	On Highway 1A to Exshaw
05:04 PM	0.4	0.043	1.45	0.000	0.001	0.005	0.002	0.001	
05:05 PM	0.3	0.043	1.78	0.000	0.000	0.003	0.000	0.000	
05:06 PM	0.3	0.043	1.75	0.000	0.000	0.000	0.001	0.001	
05:07 PM	0.2	0.044	1.73	0.000	0.000	0.000	0.000	0.000	
05:08 PM	0.2	0.043	1.77	0.000	0.000	0.000	0.002	0.001	
05:09 PM	0.2	0.042	1.74	0.000	0.000	0.001	0.002	0.000	
05:10 PM	0.2	0.042	1.74	0.000	0.000	0.003	0.004	0.000	Passing Baymag Plant west entrance
05:11 PM	0.3	0.042	1.73	0.000	0.000	0.003	0.004	0.000	
05:12 PM	0.3	0.043	1.75	0.000	0.000	0.001	0.002	0.001	
05:13 PM	0.3	0.042	1.79	0.000	0.000	0.000	0.002	0.000	Passing Baymag Plant #1 entrance
05:14 PM	0.6	0.040	1.78	0.000	0.000	0.004	0.001	0.001	**Exshaw residential monitoring, 5:14 to 5:41 PM.**
05:15 PM	0.4	0.041	2.06	0.000	0.000	0.001	0.001	0.001	Turning onto Wind Ridge Rd., Exshaw
05:16 PM	0.3	0.041	1.88	0.000	0.000	0.001	0.002	0.000	
05:17 PM	0.7	0.040	1.78	0.000	0.000	0.006	0.009	0.000	Turned around, S. on Windridge Rd
05:18 PM	0.3	0.042	1.70	0.000	0.000	0.005	0.008	0.000	Dense plume from kiln #5, 2-3 minutes
05:19 PM	0.2	0.040	1.80	0.002	0.000	0.004	0.008	0.000	taking photographs
05:20 PM	0.3	0.017	1.73	0.007	0.117	0.151	0.032	0.003	
05:21 PM	0.3	0.033	1.69	0.003	0.102	0.119	0.014	0.001	
05:22 PM	0.3	0.039	1.68	0.000	0.056	0.064	0.007	0.001	
05:23 PM	0.5	0.041	1.85	0.000	0.026	0.028	0.000	0.000	
05:24 PM	0.5	0.040	1.91	0.000	0.014	0.015	0.000	0.000	Mt Kidd Cr., turning around
05:25 PM	0.7	0.036	1.90	0.001	0.016	0.018	0.000	0.000	
05:26 PM	0.5	0.027	1.98	0.002	0.045	0.041	0.000	0.001	
05:27 PM	0.7	0.037	1.94	0.001	0.024	0.037	0.010	0.000	
05:28 PM	0.5	0.017	1.81	0.019	0.118	0.113	0.000	0.003	Grotto Mtn. Dr., turning around
05:29 PM	0.4	0.004	1.86	0.015	0.220	0.241	0.018	0.003	#30 Wind Ridge Rd, SO2 odor
05:30 PM	1.0	0.008	1.92	0.009	0.208	0.240	0.029	0.002	

One-Minute Average Pollutant Concentrations from Mobile Monitoring of the Bow Corridor: March 12, 1994

TIME MST	CO PPM	O3 PPM	THC PPM	SO2 PPM	NO PPM	NOX PPM	NO2 PPM	H2S PPM	ROUTE DESCRIPTION
05:31 PM	0.6	0.016	1.76	0.010	0.196	0.250	0.052	0.003	
05:32 PM	0.3	0.019	1.77	0.007	0.161	0.282	0.119	0.002	
05:33 PM	0.3	0.024	1.78	0.010	0.225	0.262	0.034	0.003	
05:34 PM	0.2	0.032	1.73	0.003	0.181	0.211	0.027	0.001	
05:35 PM	2.5	0.039	2.42	0.002	0.100	0.148	0.046	0.001	Mt Kidd Cr., turning around
05:36 PM	1.6	0.036	2.00	0.001	0.074	0.127	0.050	0.001	
05:37 PM	0.4	0.022	1.99	0.007	0.111	0.121	0.008	0.002	
05:38 PM	0.3	0.029	1.93	0.003	0.099	0.103	0.001	0.001	
05:39 PM	0.3	0.040	1.85	0.000	0.043	0.045	0.000	0.000	
05:40 PM	0.3	0.042	1.78	0.000	0.017	0.019	0.000	0.001	Highway 1A, heading E.
05:41 PM	0.2	0.039	1.84	0.001	0.007	0.010	0.000	0.001	**Highway #1A from Exshaw to Hwy #1X to Hwy #1,**
05:42 PM	0.3	0.021	1.81	0.004	0.010	0.023	0.011	0.000	**5:41 to 5:51 PM.**
05:43 PM	0.1	0.017	1.82	0.002	0.016	0.038	0.021	0.001	Passing Continental Lime entrance
05:44 PM	0.2	0.029	1.81	0.001	0.010	0.031	0.020	0.001	
05:45 PM	0.3	0.032	1.80	0.001	0.009	0.030	0.018	0.001	
05:46 PM	0.2	0.031	1.80	0.000	0.005	0.023	0.017	0.001	
05:47 PM	0.3	0.035	1.85	0.001	0.000	0.015	0.013	0.001	Turning onto Highway 1X
05:48 PM	0.3	0.041	1.78	0.000	-0.003	0.007	0.008	0.000	
05:49 PM	0.2	0.042	1.80	0.000	-0.003	0.003	0.004	0.000	
05:50 PM	0.2	0.040	1.99	0.000	-0.004	0.002	0.003	0.000	Turning E. onto Transcanada Highway

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